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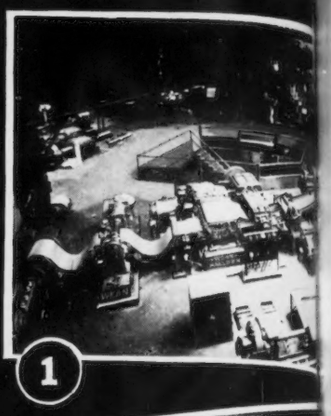

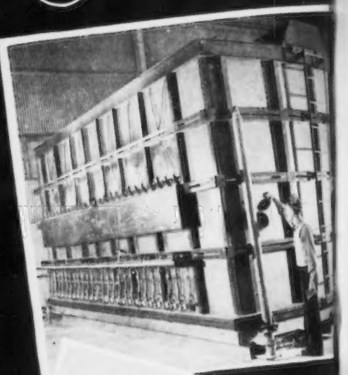

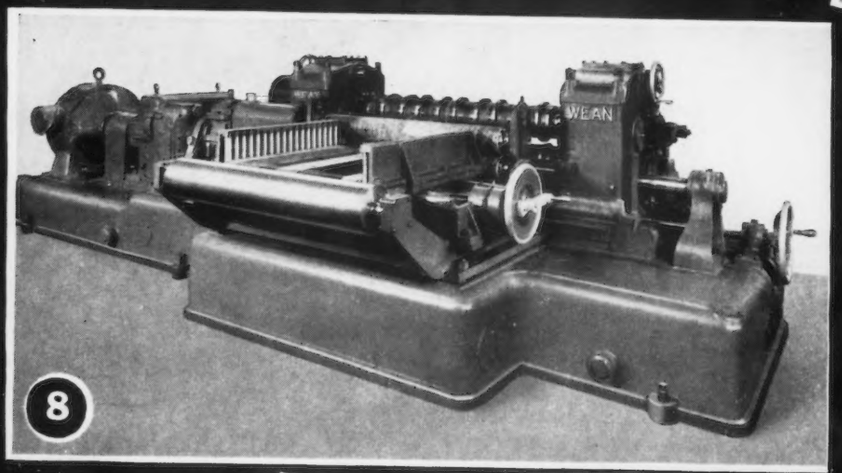

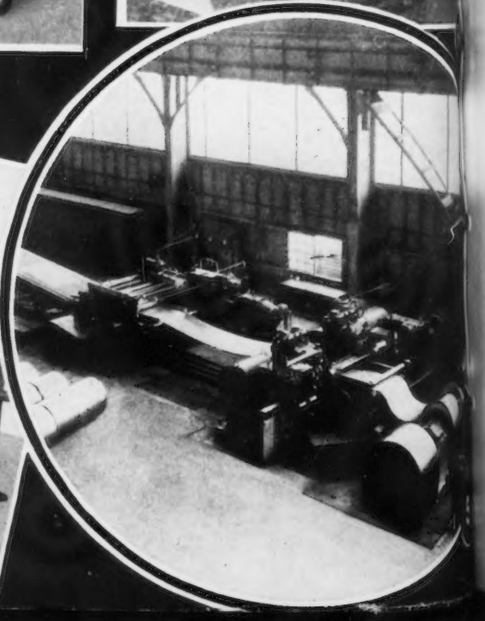

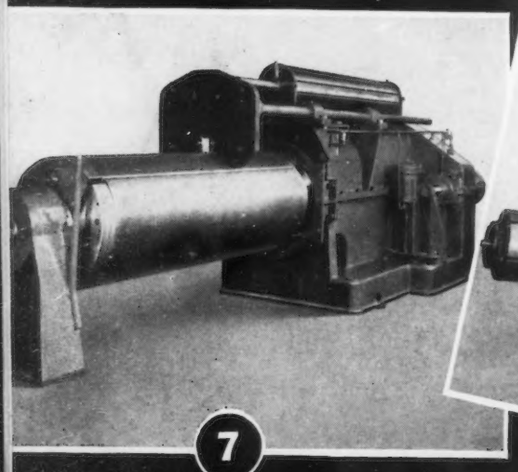

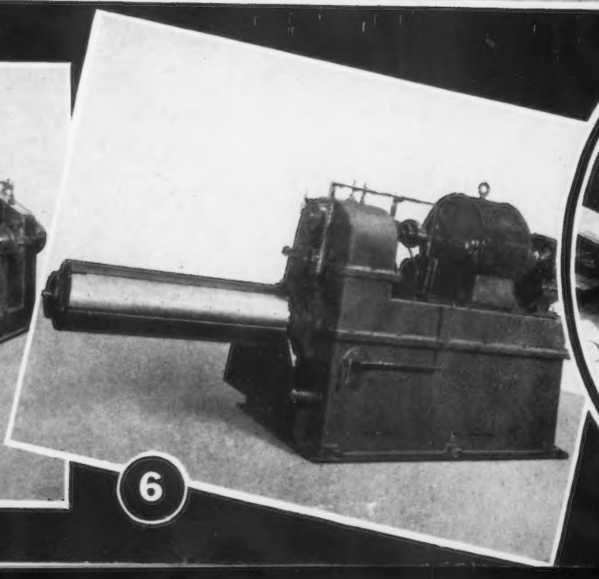

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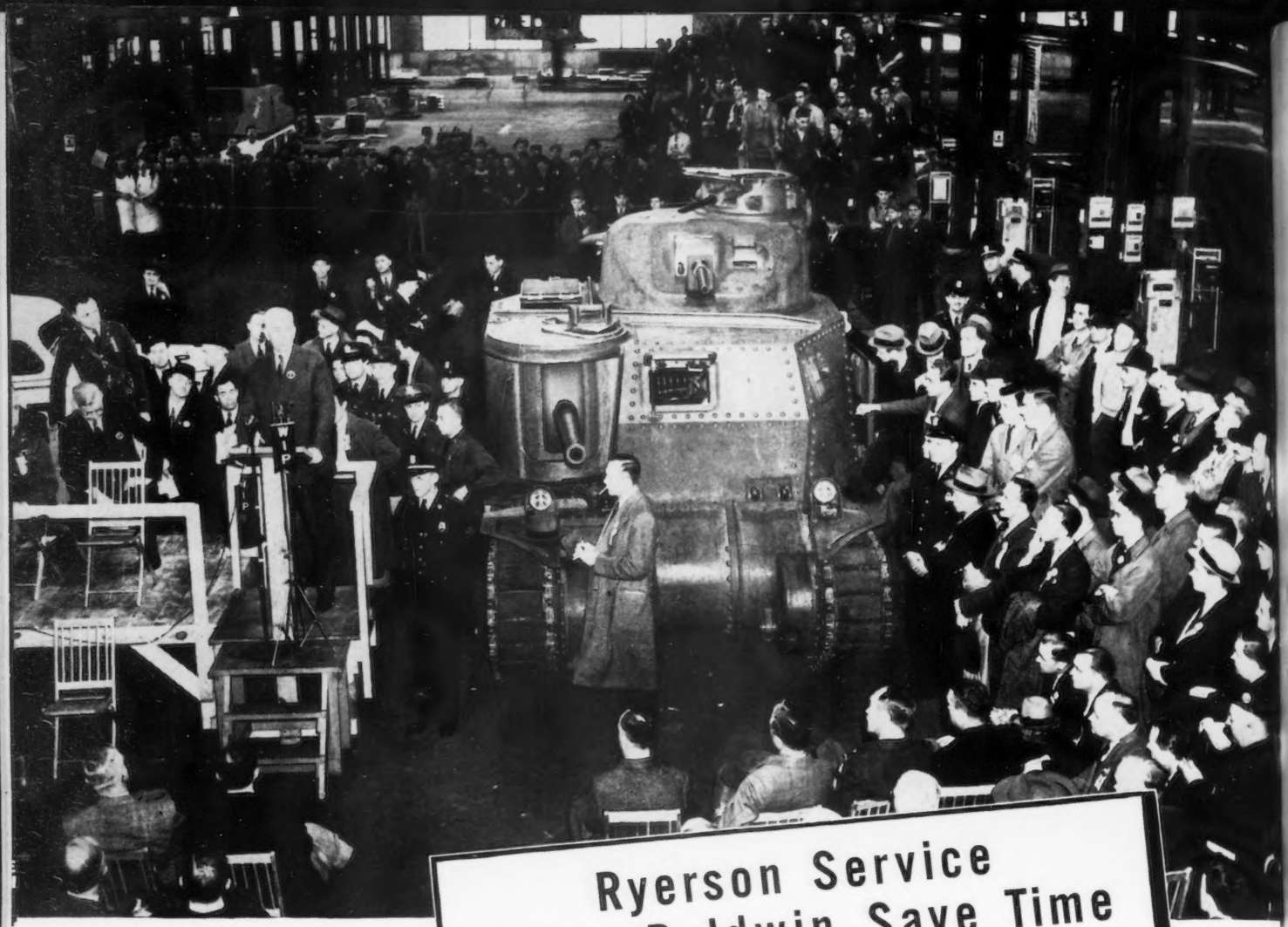

Mr. Charles Brinley, President of the Baldwin Locomotive Works speaking at ceremonies when Baldwin's first M-3 tank was turned over to the Army.

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THE IRON AGE

OCTOBER 23, 1941

ESTABLISHED 1855

The Poor Little Tiger Cat

ONCE upon a time there was an old gentleman who was kind hearted and who had a soft spot in his heart for dumb animals.

Particularly appealing to him were forlorn alley cats and the more bedraggled they were, the more he was moved to compassion towards them. When he saw one he would open the door, call "here kitty, kitty" and then run for the milk bottle.

Now that policy and practice did him no harm, made him feel good and was of considerable benefit to the alley cats. He did get a few scratches once in a while, but the quick application of iodine to the scratch seemed to remedy the matter and seemed to him more humane than to apply his boot to the offending cat, as many of us might have done under the circumstances.

As time went on, this interest in friendless felines became almost a passion with the old gentleman and he became one of the milk company's best customers. He could not, of course, provide them with lodgings as well as meals, but that did not seem to matter for all of them knew with uncanny accuracy when meal time arrived and called regularly. It is true that they did not exhibit much gratitude but he did not mind that, knowing them to be dumb animals. And, after all, none of them tried to take advantage of him by making unreasonable demands or trying to run his business for him.

As time went on, the old gentleman's eyesight began to fail somewhat. He could not distinguish the breed of cats as well as formerly, but anything that walked on four legs, had a tail and meowed still received his attention and his hospitality.

One day, shortly after the circus had left town, and when the cat dinner time arrived, there was a newcomer to the cat procession. It was indeed a very pretty cat, somewhat larger than the usual run, but it had four legs and a tail like the rest of them and it meowed very appealingly. It was such a good-looking cat, yellow with black stripes, that the old gentleman determined to adopt it and bring it into his home.

Now this pretty little tiger cat grew and grew. And as it grew, its appetite increased enormously. And it began to ask for more and more; very politely at first, but after a while more menacingly. And the more that it demanded, the more the old gentleman gave it; for by that time its claws had grown so long that even he could see them. And to tell you the truth, they were rather terrible.

Eventually, the tiger cat's appetite grew so great that the old gentleman could no longer afford to satisfy it. Whereupon the cat turned upon him and devoured him.

The moral to this story? There isn't any, unless it is to watch your step before you adopt a tiger cat.

J. H. Vanderventer

The launching of the "Star of Oregon" from the yards of the Oregon Shipbuilding Co.—one of the first Liberty Ships to slide down the ways. Hundreds of tons of Inland steel were used in its construction.

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European Munitions Cleaning Technique

By MARCEL ZINTY

Mechanical Engineer, Magnus Chemical Co., Garwood, N. J.

LAST week the author discussed the manufacturing flow of various munitions and munition parts, as well as the cleaning equipment and technique for shell, bomb and grenade bodies. In this second and final article, cleaning methods are described for shell and cartridge cases, bullet jackets, cups and anvils for primers, cases for anti-tank and land mines, fuses, detonators, and bullet cores.

DIFFERENT types of washing machines are used according to the size, form and treatment of Class B parts: shell and cartridge cases, machine gun bullet jackets, cups and anvils, and anti-tank and land mine cases. These may be classified into the following categories for washing purposes: (1) shell cases up to 25 mm. in diameter, (2) rifle and machine gun cartrdige cases, 0.30 to 0.50 caliber, (3) shell cases more than 25 mm. in diameter, (4) bullet jackets, cups, and anvils, and (5) anti-tank mine cases. There is a type of washing machine best adapted to each group.

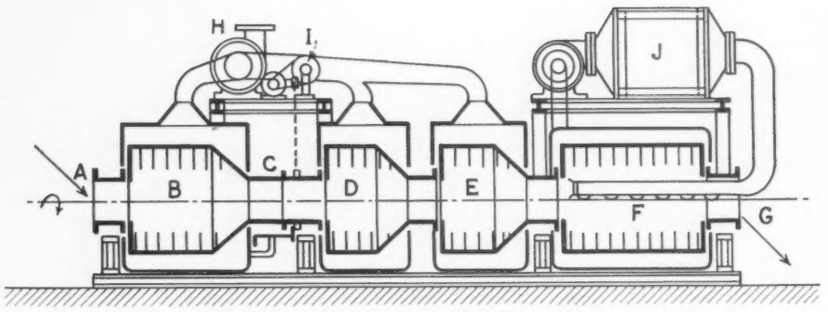
Three washing operations are required in making these shell cases up to 25 mm. in diameter and for rifle and machine gun cartridge cases: washing and pickling, washing and degreasing, and final washing and cleaning. For purposes of standardization it was current practice to use the same machine to carry out all three operations. The only difference was the use of suitable materials of construction for pickling operations. These units were built of stainless steel or aluminum bronze, while ordinary units were of cast iron or steel.

Fig. 4 shows such a machine for use on shell case draws up to 25 mm. Originally the pickling was done in cold sulphuric acid solution, but war time demands speedily introduced the hot pickling operation. War demands also made necessary the addition of a drying and cooling phase, because neither time nor floor space was available to allow for natural drying and cooling between draws. In addition, it also was necessary, in connection with shell cases of all sizes (even 75 mm.) to connect the loading end of the pickling machine directly to the discharge end of the annealing furnace so that the cases would fall directly from the furnace into the pickling bath. With annealing temperature between 1022 and 1112 deg. F., the temperature of the cases just before entering the pickling bath was about 662 deg. F. The temperature of the pickling solution was always near boiling point, or 212 deg. F., so that the actual temperature drop on the work, corresponding to a tempering effect, was about 482 deg. F. This step cannot be applied to the last draws, because, as the cases are drawn to thinner and thinner walls, and are soft after annealing, denting and distortion will result from handling in this manner.

The machine shown in Fig. 4 is of the revolving drum type, consisting of a series of drums in line revolving at a uniform speed. The lower part of each drum is immersed in a tank containing the hot solution required for that phase of the operation. The drum may also rotate above a draining pan or inside a drying chamber. Following is a generalized lay-out of typical drum functions:

TABLE II—Drum Functions

Drum No.	Treatment
1	Pickling, degreasing, or washing
2	Draining
3	Rinsing
4	Neutralization or second rinsing
5	Draining
6	Drying



A	Loading end	F	Drying drum
B	Pickling or degreasing drum	G	Unloading end
C	Draining drum	H	Vapor exhauster
D	Rinsing drum	I	Driving device
E	Rinsing or neutralizing drum	J	Drying device

FIG. 4—This machine layout shows the pickling and degreasing process for shell case draws up to 25 mm. in diameter.

All drums are perforated and equipped with an inside worm and special interior raising device, allowing the shell cases to pass at a uniform rate of delivery from one drum to the following, and from the first to the last drum. Such machines are operated by two men, one at the loading and the other at the unloading end.

Each drum is designed according to the length of each operation and the amount of parts it has to carry. A speed changer makes it possible to increase or reduce the duration of the pickling or degreasing operation without altering the efficiency. The output of standard units was between 1300 and 2000 lb. of draws per hr., with a 30-min. pickling in some instances.

The pickling tank is equipped with a device for cooling or heating the acid bath, whether the machine is connected to the annealing furnace or not. In such machines it is obvious that the parts are treated in bulk and they roll and fall with inherent risks of denting. This is not harmful for the first four or five draws, while the parts are thick and resistant, but after the last two draws the sides are too thin to resist the shocks without denting, and it was necessary to abandon the use of a drum-type machine for these two items. Therefore, the last two draws are treated on the first type of washing machine described, shown in Fig. 1, and in the same manner as shells. Such machines may be used because the two last draws are not followed by annealing and they only require a degreasing without pickling. The polishing of finished shell cases is a hand buffing operation.

The pickling and degreasing machines for rifle and machine gun cartridge draws (0.30 to 0.50 caliber), shown in Fig. 5, is the same as that used for washing shell cases up to 25 mm. and for rifle and machine gun cartridge cases, as illustrated in Fig. 4, except that the length and diameter of the drums are suited to the size of smaller parts and there are no drying drums. The parts are self-drying if the last solution is kept at a boiling temperature.

Owing to the relative smallness of the parts, there is no denting effect on either draw during the pickling or washing process.

Standard units are capable of an hourly output of 50,000 draws of any kind.

The machine, shown in Fig. 6, for pickling and final washing, cleaning, and burnishing for the last draw of rifle and machine gun cartridges, is a combination of the one for pickling and degreasing, with a special burnishing device in line with the washing drums.

A particular feature of this machine is that it is entirely automatic and continuous, including the burnishing operation. The rough cartridges are introduced at the loading end and they come out at the unloading end completely pickled, degreased, washed and burnished. The machine is operated by two men, and standard units were built for an hourly output of 50,000 cartridges.

After the final washing, the cartridges are raised up to a certain level by means of an elevator and then mixed with a measured quantity of hard sawdust before entering the burnishing barrel. At the exit of the burnishing barrel, cartridges and sawdust are automatically separated and the sawdust is regenerated and automatically reincorporated with a new load of cartridges to be burnished.

Large Shell Treatment

Owing to the dimensions of shell case draws above 25 mm. and espe-

A	Loading end	F	Drying drum
B	Pickling or degreasing drum	G	Unloading end
C	Draining drum	H	Vapor exhauster
D	Rinsing drum	I	Driving device
E	Rinsing or neutralizing drum	J	Speed changer

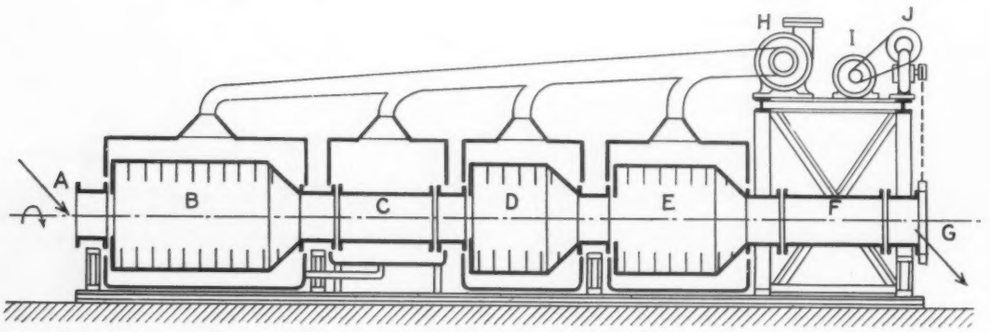


FIG. 5—This machine design is for pickling and washing rifle and machine gun cartridges between 0.30 and 0.50 caliber.

cially the anti-tank 50 mm. and the 75 mm. shells, the machine shown in Fig. 4 would not be advisable. The pre-war practice was to use the old still tank process for the pickling and washing of these parts, but increased demands, due to war needs, compelled speedy development of automatic and continuous units capable of a large production, with a minimum of man power.

Such a machine is shown in Fig. 7. The draws, as they come out of the annealing furnace, fall into a cold water tank where they are cooled. They are then raised and taken to a loading table where a man places them upright in suitable racks. The loaded racks are hung on an overhead conveyor and successively immersed in the different pickling, rinsing, neutralizing tanks. The racks are then emptied at the unloading end and returned. A special device provides for the complete handling of the racks in and out of each tank and for their return to the loading end of the machine. Standard units were designed for an output of 1600 75 mm. shell case draws per hr.

It should be noted that (1) bullet jackets are fragile and precautions must therefore be taken to avoid denting and damage by rolling on each other or being dropped in bulk, (2) cups and anvils are very small units, and cannot be mixed with other items, (3) anti-tank mine cases are rectangular boxes instead of the common rounded form of other munitions items. With these facts in view, it is clear that a special type of machine is needed for such items.

Fig. 8 shows such a machine, the major feature of which is the use of closed baskets in which the parts are loaded in bulk in such a way that they cannot roll on one another even though the baskets are constantly rotating. Another feature is the fact that each basket contains only one kind of unit. This machine is well adapted to mine cases since it provides for complete rotation of units and hence thorough contact with cleaning solutions.

The baskets, as shown in Fig. 8, are suspended on a conveyor which immerses the parts automatically and continuously in the different washing and rinsing solutions. The return travel of the baskets is accomplished in the upper part of the machine in a drying, cooling-off section. A special device makes the baskets rotate in and out of the washing and rinsing solutions.

Standard dimensions of baskets abroad were 9x9x20 in., but they can be made to suit any conditions. One man can handle the loading and unloading of about 50 baskets of parts per hr.

Cleaning Class C Parts

It has been stressed previously that fuse parts and detonators must be extremely clean. Another requirement is that the cleaning operation be carried out in such a manner as to avoid damage to the precisely machined parts of the different items which constitute a fuse. Another difficulty is due to the fact that a complete fuse is composed of sometimes 20 different units made of different metals and of different shapes (often in different plants), varying from a spring to a hollow cap. All these items must be treated apart, without any risk of mixing together.

Therefore, the adequate type of washing machine for fuse parts was of the type shown in Fig. 8, in which all kinds of parts may be treated at the same time without risk of mixing together, provided each basket contains only one kind of part. Some baskets are specially designed with shelves and cells to hold most delicate parts such as the brass threaded bodies of fuses. Detonator parts are handled in the same manner.

As for bullet cores, they are washed either in machines of the type shown in Figs. 5 or 8, depending on the material of which they are made and the kind of finish required. After fuse parts are separately washed they are assembled to make the complete fuse. The body is partially tinned, after which there is a water test, followed by a final washing and drying operation in the machine shown in Fig. 9.

Finished and assembled fuses are placed on special shelves stacked by fours or fives, each shelf containing about 100 fuses. The piles of shelves are placed jointly on the conveyor of a combined washing and drying machine of the type shown in Fig. 9. Fuses are passed successively through the following sections: degreasing; rinsing No. 1; rinsing No. 2; drying. Standard units have an hourly output of 5000 fuses and are operated by two men.

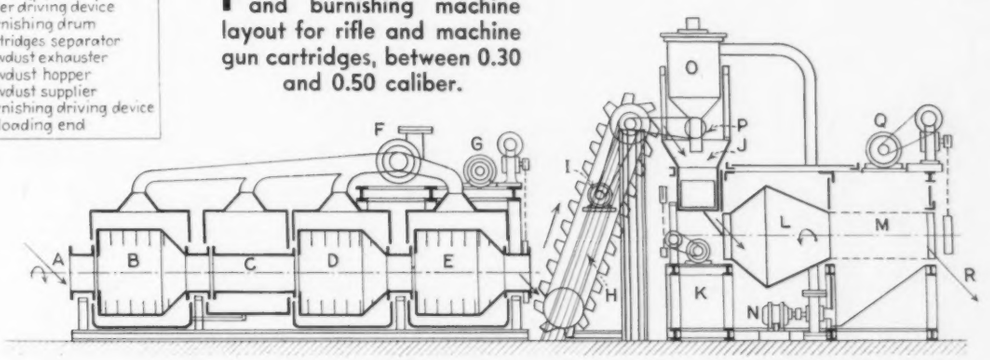
Installation of Washing Machines

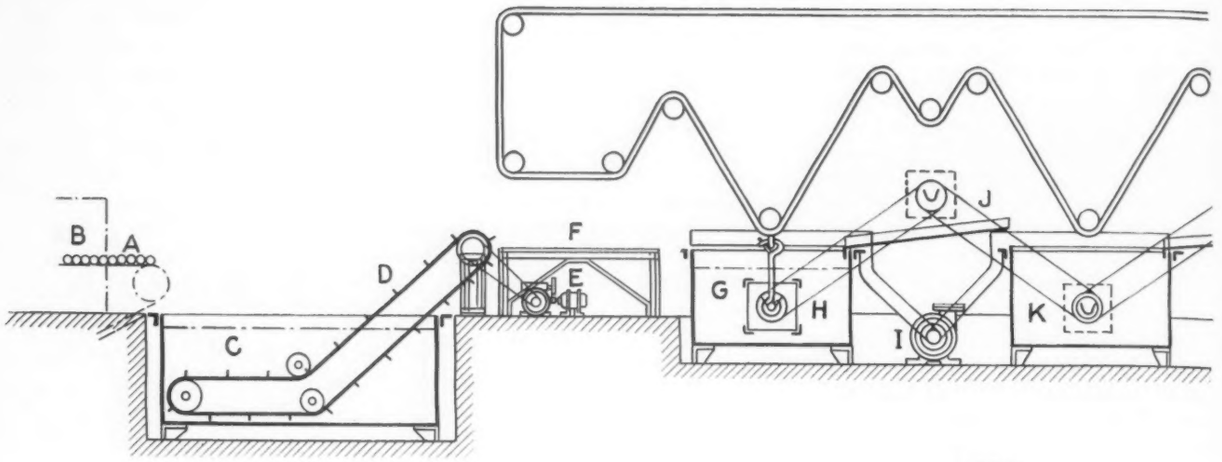
In shell plants washing machines are installed in line with the manufacturing process after the last machining operation and before the automatic paint-spray machine, if the plant delivers painted shells.

In a large European manufacturing plant equipped for handling 60,000 75 mm. shells per day, the final washing operation was carried

A	Loading end	J	Cartridges mixer
B	Pickling drum	K	Mixer driving device
C	Draining drum	L	Burnishing drum
D	Rinsing drum	M	Cartridges separator
E	Neutralization drum	N	Sawdust exhauster
F	Vapor exhauster	O	Sawdust hopper
G	Drums driving device	P	Sawdust supplier
H	Elevator	Q	Burnishing driving device
I	Elevator driving device	R	Unloading end

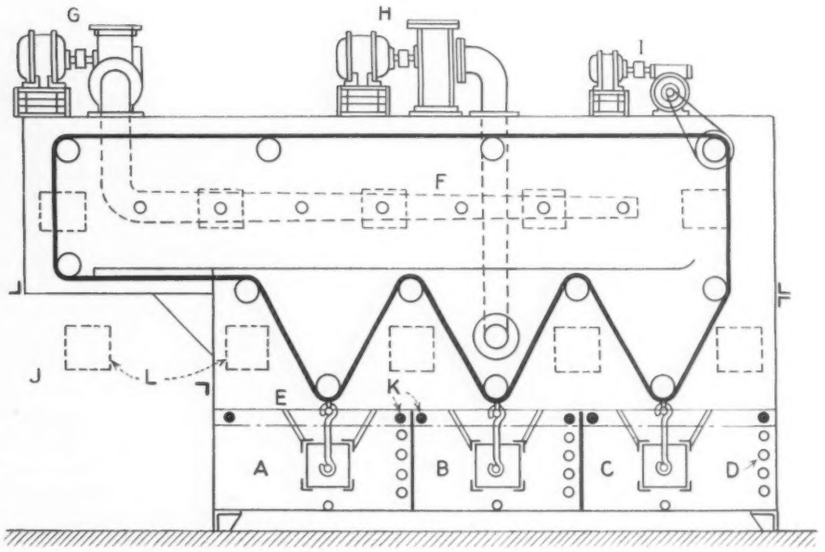
FIG. 6—Pickling, washing, and burnishing machine layout for rifle and machine gun cartridges, between 0.30 and 0.50 caliber.





ABOVE

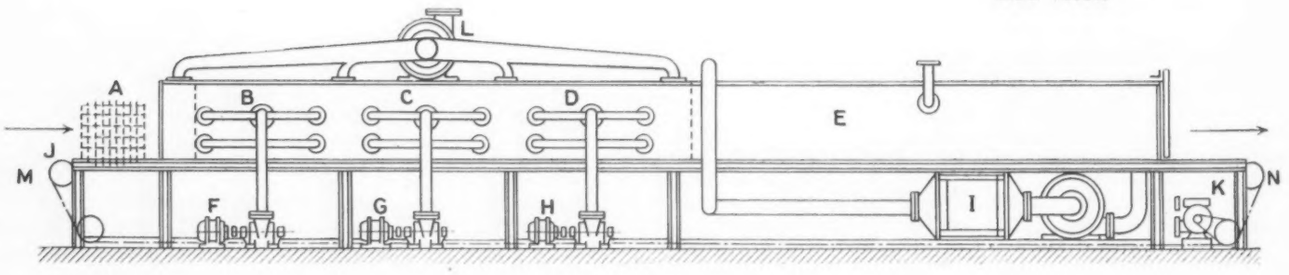
FIG. 7—This machine is for pickling, degreasing and washing shell cases greater than 25 mm. in diameter.



A	Washing section	G	Cooling device
B	1st. Rinsing section	H	Vapor exhauster
C	2nd. Rinsing section	I	Conveyor device
D	Heating coils	J	Loading-Unloading end
E	Conveyor	K	Sprayers
F	Drying cooling section	L	Baskets

LEFT

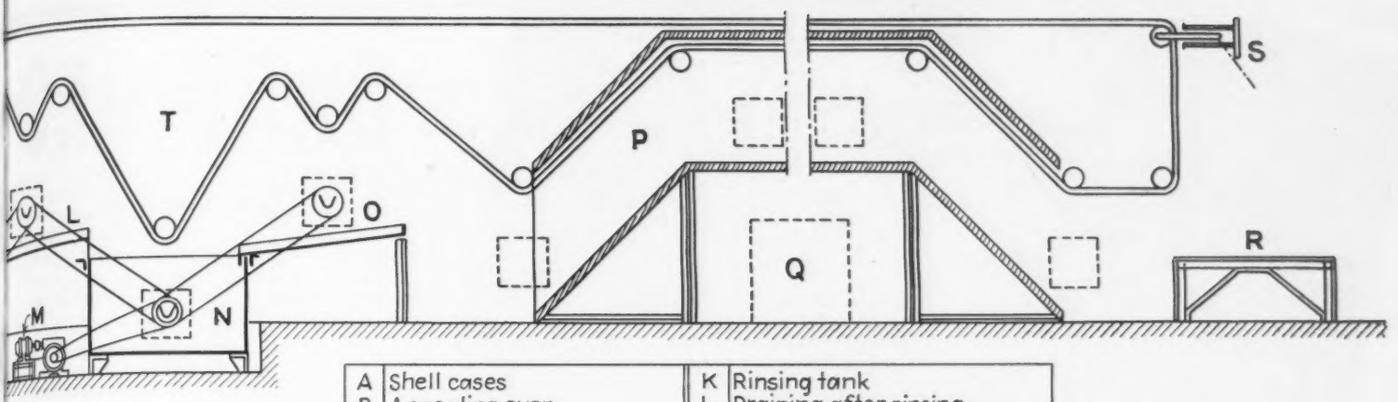
FIG. 8—Fuse and detonator parts and bullet jackets are washed in a machine of this layout.



A	Fuses	H	2nd. Rinsing pump
B	Washing section	I	Drying device
C	1st. Rinsing section	J	Conveyor
D	2nd. Rinsing section	K	Conveyor driving device
E	Drying section	L	Vapor exhauster
F	Washing pump	M	Loading end
G	1st. Rinsing pump	N	Unloading end

BELOW

FIG. 9—This machine design was developed for washing and drying assembled fuses.



A	Shell cases	K	Rinsing tank
B	Annealing oven	L	Draining after rinsing
C	Cooling tank	M	Baskets rotating device
D	Elevator	N	Neutralization tank
E	Elevator driving shaft	O	Draining after neutralization
F	Loading table	P	Drying oven
G	Pickling or degreasing tank	Q	Drying device
H	Rotating baskets	R	Unloading table
I	Vapor exhauster	S	Conveyor stretching device
J	Draining after pickling	T	Overhead conveyor

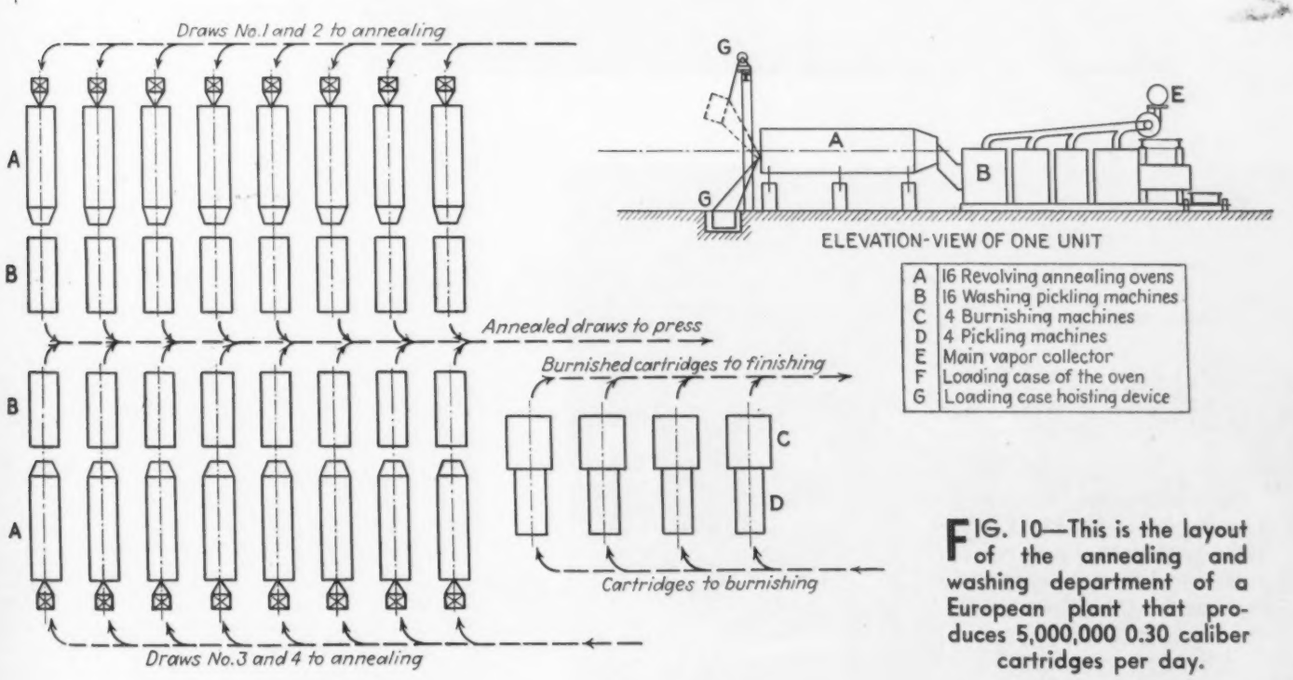
on in five machines, of the type shown in Fig. 1, arranged in battery in a special washing room.

In drawing plants where shell cases and cartridges are made, pickling and washing machines are usually in line with the annealing furnaces. Fig. 10 shows the layout of the annealing, pickling, washing, and burnishing department of one of the most up-to-date European plants. This plant was equipped to produce 200,000 rifle and machine-gun cartridges per hr., or 5,000,000 per day.

In fuse plants, washing machines are located in a general washing room where all parts are collected.

In loading plants, washing machines are located according to requirements, either for fresh or stored projectiles. They also have to deal with used shell cases in order to recover them for re-loading. Therefore, loading plants are generally equipped with suitable types of washing machines in case a cleaning operation should be necessary on some stored or fired items.

Ed. note: It will be noted that the data covered in this article do not include any discussion of the specific types of cleaning materials best suited to the machines and operations involved. This has been done advisedly in order to confine the story to the subject of washing methods and washing machines in particular. A complete handbook is available covering the various cleaning compounds suitable for munitions cleaning. It is worthy of note that most of these cleaners were in extensive use abroad prior to 1940. They are, of course, in wide use today on American munition cleaning operations.



A	16 Revolving annealing ovens
B	16 Washing pickling machines
C	4 Burnishing machines
D	4 Pickling machines
E	Main vapor collector
F	Loading case of the oven
G	Loading case hoisting device

FIG. 10—This is the layout of the annealing and washing department of a European plant that produces 5,000,000 0.30 caliber cartridges per day.

CARBIDES

From Powder to Tool Bits

ABOVE, LEFT

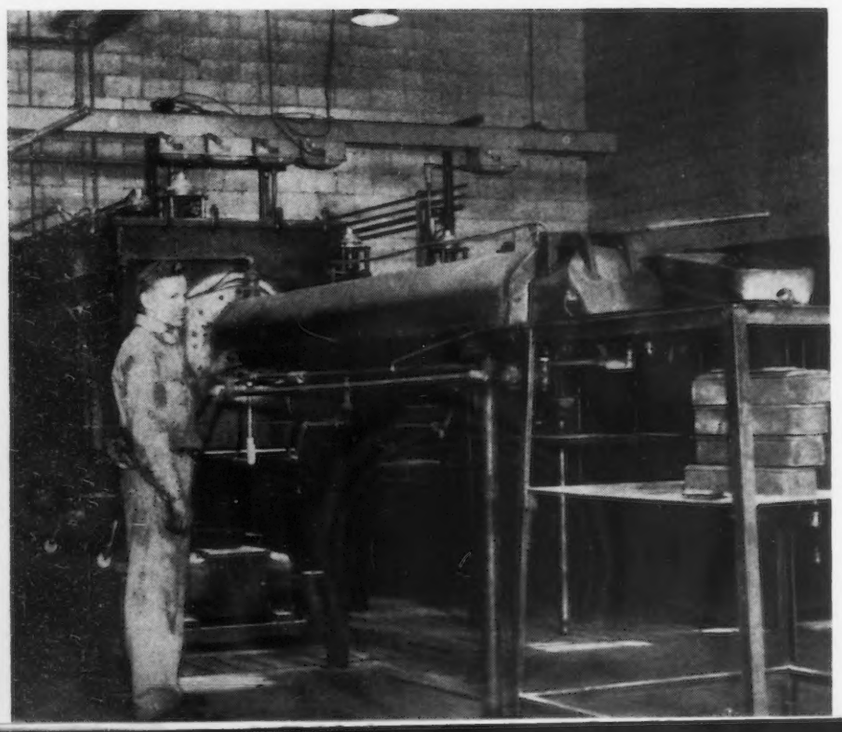
CONTROLLED particle size is vital in producing cemented carbides. These new metal powder sifters are capable of screening and sifting enough metal powder in 24 hr. to produce 25,000 Carboloy standard tools.

o o o

LEFT

MASS production of identical "tips" for carbide tools is facilitated through the development of this automatic tabletting press, with production capacity well up in the hundreds of pieces per hr. Powder is fed by gravity from the hopper.

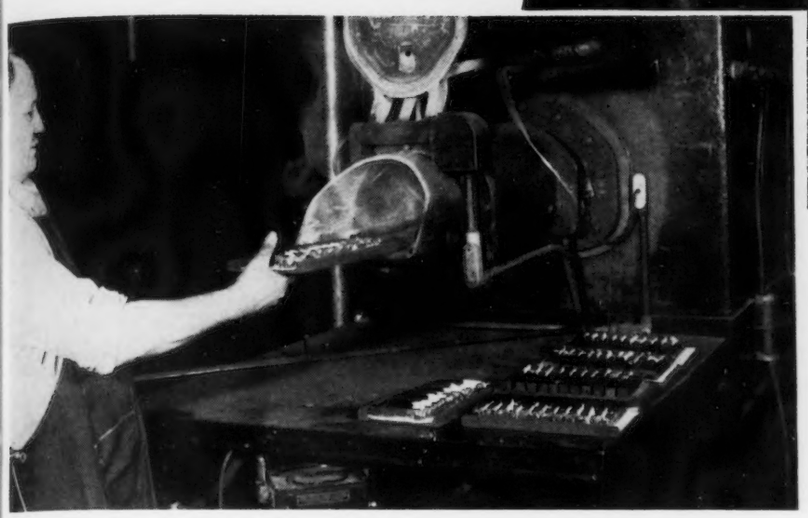
o o o



LEFT

ONE of 30 hydrogen atmosphere electric furnaces at Carboloy, this sintering unit can handle up to a million grams of carbide blanks for standard tools every 48 hr., passing them through the complete heat treat cycle—from pressed blank to hardened tip.

TODAY'S intense interest in powder metallurgy, believed by many to presage a new era in metal fabrication and working methods, is an old story to the carbide tool industry—An old story, and yet entirely new again since the introduction of standard tools has permitted the adoption of large-scale production methods by that industry. The illustrations on these two pages show some of the highlights of how one company, Carboloy Co., Inc., has adapted mass production methods to powder metallurgy.



BRAZING of tips to shanks, once a hand operation, is now handled in precisely controlled furnaces. This one alone can produce 2000 1/2-in. square tools every 24 hr.

WHILE the tips are being produced, standard tool shanks are being milled on special fixtures designed to reduce set-up time to a minimum. The milling machine and fixture shown, for instance, can handle 3000 shanks every 24 hr. Also used are single spindle millers with indexing fixtures for loading and unloading to permit continuous operation.

o o o

LEFT

MASS sand-blasting in enclosed booths finishes up the tools, ready for dipping of shanks to provide color identification. Steel-cutting tools are copper colored, while aluminum finish is used on tools for machining cast iron and non-ferrous materials.

o o o

THREE-SPINDLE automatic grinder especially developed to speed grinding of tools. Continuous in operation, this grinder finishes side and top angles and clearances. It will grind 1200 standard tools every 24 hr.

Gear Inspection

THE devices and machines referred to in the first part of the article are intended primarily for checking individual elements of gear teeth independent of other elements. Such devices are especially useful for checking original designs during various stages of manufacture, or when a check on individual tooth elements is desired. A close study of the action of gear teeth will reveal that there is always more than one tooth affecting the operation of a mating pair of gears so that a careful check of the individual elements does not present a complete picture. An individual tooth element check does not indicate what effect a certain error in one tooth will have on another tooth. An inspection of all errors in combination more nearly meets the demands of manufacturing because it more closely approaches the actual conditions obtained when the gears are in operation.

Fig. 11 shows a close-up of an inspection machine known as the Red Liner, deriving its name from the red-line chart of gear inaccuracies which it produces. Its operation is based on the principle that errors in gears affect their center distance relation when the gears are brought into intimate contact and rotated. One gear (generally a master gear of known accuracy) is held on the driving spindle, the latter being retained in a fulcrum bracket. The gear to be tested is held on a fixture or fixed stud, depending upon its design.

Errors in the gear being tested impart a movement to the fulcrumed bracket. This, in turn, through a multiplying lever arrangement, operates a pen which is in contact with a constantly moving paper chart. This device charts all errors in combination and makes a permanent record. It is possible to analyze the chart so produced and to determine the magnitude and location of various inaccuracies. The multiplication is 200:1, so that an error of 0.001 in. in the gear is represented as 0.200 in. on the chart.

Charting Gear Tooth Inaccuracies

This inspection machine positively reproduces the inaccuracies in the work, and when the gear to be inspected is checked against a master of known accuracy, the result is a composite of all of the errors in the inspected gear. The errors, however, as the accompanying charts, Figs. 12, 13, 14, 15 and 16, show, can be analyzed and their location and magnitude determined. These charts present the following errors:

(1) A shortened tooth resulting in lack of continuous action, Fig. 12.

(2) Variations in tooth spacing or circular pitch, Fig. 13.

(3) Variation in pressure angles between two gears, Fig. 14.

(4) One gear cut eccentric, Fig. 15.

(5) One of the gears with a high fillet causing interference, Fig. 16.

Charts of Cut, Hardened, and Lapped Gears

In addition to recording tooth errors, the Red Liner also indicates the condition of the contacting tooth surfaces. Fig. 17 shows a chart of a gear cut on a gear shaper without any particular pains being taken to obtain extreme accuracy. In fact this would represent an average gear for this particular diameter and pitch. The accumulative errors do not exceed 0.001 in., but the tooth surfaces are not extremely smooth and there are slight errors in circular pitch. This, however, would be a satisfactory gear if it could be used without being heat treated after cutting.

While great strides have been made in producing steels for making gears, it is still impossible to put a gear in the fire and have it come out in the same condition in which it went in. Distortion, although in some cases slight, still takes place, and as shown in Fig. 18, this particular gear did not improve any when placed in the fire. Almost invariably gears swell dur-

o o o

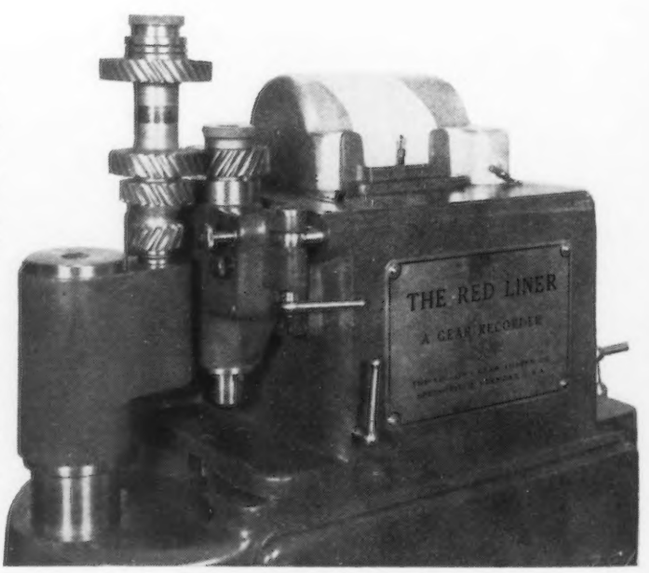


FIG. 11—The Red Liner checking machine charts all gear errors in combination and makes a permanent record. It functions on the principle that errors in gears affect their center distance relation when the gear to be tested, which is mounted on a fixed stud, is brought into intimate contact and rotated with a master gear mounted on a spindle retained in a fulcrumed bracket.

o o o

Methods

By DOUGLAS T. HAMILTON
Fellows Gear Shaper Co., Springfield, Vt.

ing hardening. The two points on the teeth at which the greatest distortion takes place is in the fillet and at the top of the tooth. The fillet usually rises, and the top of the tooth thickens on the end, which on the Red Liner is indicated as combined interference and pressure angle variations. Before this particular gear was put in the fire, the accumulative error was 0.001 in. When it came out of the fire, this error had grown to 0.003 in., so that the tooth action was not as smooth as when the gear was in the "green" condition.

By lapping this gear on the Fellows gear lapping machine, using an internal-gear type lap, it was possible to bring the gear back to practically its original condition, as shown in Fig. 19. Not only has the accuracy of the gear been improved, but the tooth surfaces are considerably smoother, assuring that this lapped gear would be quieter in operation than both the "green" and the hardened gears.

Comparison of Spur and Helical Gears

Attention should be drawn to the fact that all of the previous discussion has dealt principally with spur gears. Helical gears if properly cut and mounted show a decided improvement in tooth action over spur gears. This is largely due to the fact that in helical gears contact is progressed across the face of the tooth.

This condition can be represented by a series of laminated spur gears, which, if of infinitesimal thickness, would create a pitch point of action that would develop into a helix. If this helix had an advance equal to the circular pitch in the face width of the gear, we would have what is known as "continuous helical action." It should be understood, however, that as far as the length of the line of action is concerned, this is the same as for two spur gears of the same pitch, tooth length, etc. The essential difference is that a helical gear when properly designed and cut is always in contact at the pitch line in some one plane.

In the second and concluding part of the article, the author illustrates how gear errors may be checked in combination, and analyzes the factors causing gear noise. Use of helical gears is a solution to the noise problem and calls for special checking apparatus. The importance of tooth bearing is emphasized.

The helical, or warped shape of a helical gear tooth, introduces several problems that are not common to a spur gear. Some of these are diagrammatically presented in Fig. 20. In the first place, a helical gear can be viewed in two planes—plane of rotation, and normal plane. In the plane of rotation, the tooth shape is the same as that of a corresponding spur gear; whereas, in the normal plane, the tooth is thinner, the pressure angle is less, etc. In fact all of the tooth proportions in the normal plane are different from what they are in the plane of rotation. These two planes, of course, greatly increase the inspector's problems, because in addition to checking the tooth elements that are common to spur gears, the helix angle introduces other elements that are of prime importance if accurate helical gears are to be produced.

Another point in connection with helical gears not generally appreciated is the distinction which must be drawn between lead and helix angle. Lead of a helical gear tooth is the distance that the helix travels in one revolution of the cylinder. The lead is generally measured on the pitch circle. On the other hand, there are several helix angles, such as the outside helix angle, the helix angle at the pitch circle, and the base helix angle, which is the helix angle on the base cylinder. It is therefore essential that the specific helix angle be indicated. Unless otherwise specified, this is considered as being on the pitch circle. Mating helical gears, of course, have what are known as right and left-hand teeth. In order that proper tooth action may result, both gears must have the same twist, or so-called helix angle. In checking gears, however, the operation is generally referred to as checking the lead, or the amount of angular rotation of the helix in a definite distance.

Running Tests Desirable

Many devices are employed for this purpose, some of which give fairly accurate results. It has, however, become generally appreciated that actual running tests of two mating gears, if properly handled, are much more reliable as a final check than any so-called lead-checking device. This is particularly true when gears must be checked on a production basis. It requires a very short time to run two gears together; whereas it takes considerably longer to check the lead on any of the lead-checking devices, especially if there is any apparent variation in the teeth around the gear. A point in this connection should be mentioned,

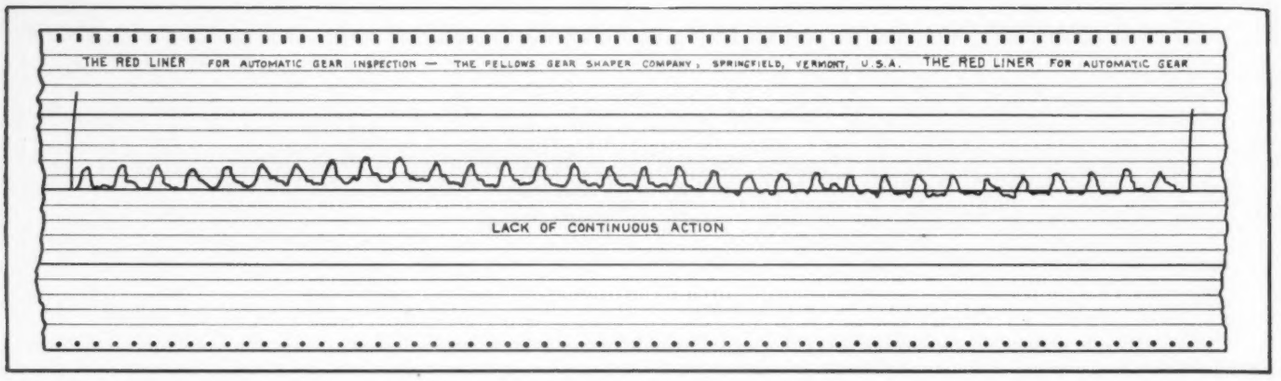

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR
LACK OF CONTINUOUS ACTION

FIG. 12—Lack of continuous action. This is a chart of a gear, the teeth of which have been shortened to such an extent that continuous action is not obtained. Action is interrupted as each tooth passes through mesh, causing a jagged peak and then a constant building up until action again ceases.

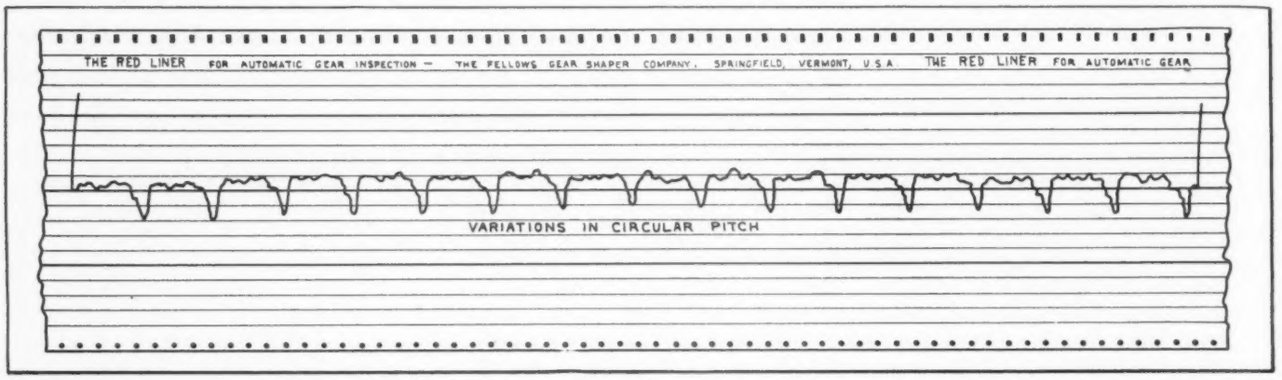

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR
VARIATIONS IN CIRCULAR PITCH

FIG. 13—Uneven tooth spacing, generally called errors in circular pitch, produces a characteristic chart. This particular gear was cut with a cutter, each alternate tooth of which was purposely ground off from its true spacing position. There are 16 jagged peaks in the line equal to one-half the number of teeth in the gear.

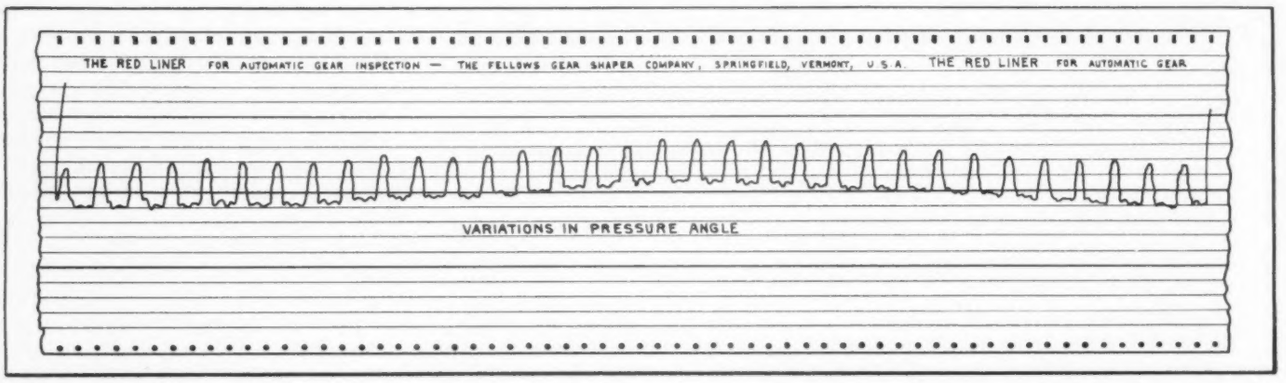

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR
VARIATIONS IN PRESSURE ANGLE

FIG. 14—Variations in pressure angle. This is a chart of a gear that varies in pressure angle from the master against which it was compared. There are 32 jagged peaks equal to the number of teeth in the gear. This error was purposely exaggerated. Slight errors in pressure angle produce a chart somewhat similar to a sine curve.

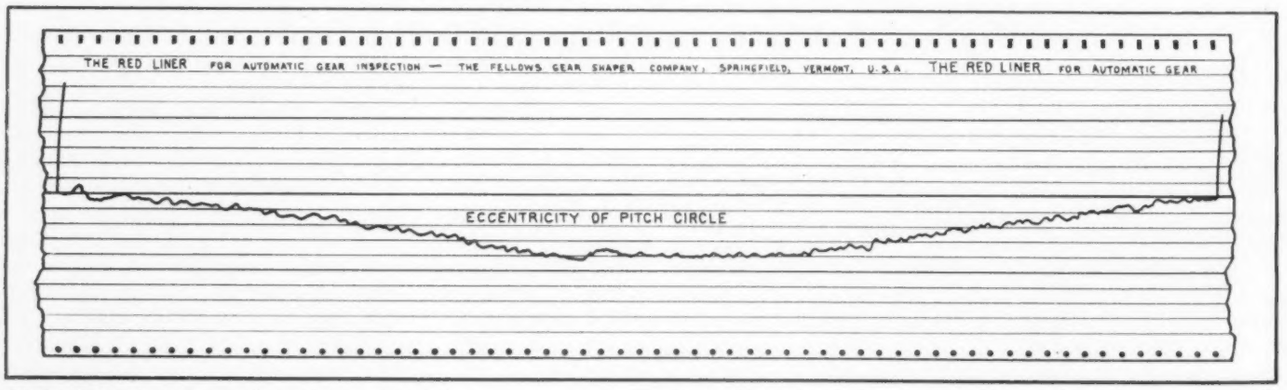

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR
ECCENTRICITY OF PITCH CIRCLE

FIG. 15—Lack of concentricity of the pitch circle is a common error which the Red Liner clearly records. This is a chart of a gear purposely cut about 0.004 in. eccentric. Eccentricity causes the recorded line to depart from the datum line, reaching the maximum deviation one-half way around the gear.

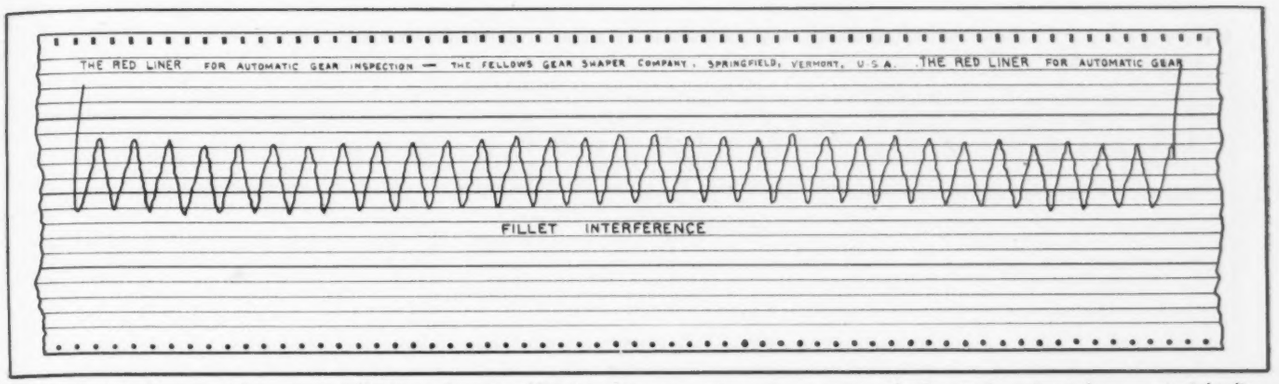

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR
FILLET INTERFERENCE

FIG. 16—Interference. There is no difficulty in locating fillet interference as it causes a series of abrupt departures from a straight line as shown here. In this case the cut gear was purposely made too shallow so that contact took place in the fillet before the profiles on the teeth could come into intimate contact, causing the gears to alternately come together and then spread apart with little or no involute action.

and that is that sometimes a tooth is apparently correct in lead but in a running test, it appears to be off. If this gear were checked on a lead-checking device, and the test made approximately on the pitch line, the lead might show all right. The error is caused by variations in profile from one end of the tooth to the other. In other words, the bearing may be on the bottom of the tooth on one end, and up on the top the other, giving what might be called as a "cross bearing," and yet the lead on the pitch line would be exact.

Some of these conditions, especially from the standpoint of design, are illustrated diagrammatically in Fig. 21 which shows a 10-pitch pinion of standard blank diameter having 12 teeth, 20 deg. full length, and in mesh with a gear of 40 teeth. Contact takes place in advance of the interference point on the line of action at the left, and we are in for trouble. The question, therefore, of quiet gear tooth action is to some extent tied up with design because there are certain definite factors that must in all cases be carefully considered.

There are in this particular case five solutions to this problem:

1. The outside diameter of the 40-tooth gear can be reduced to the point where it does not interfere with the flank of the pinion tooth, retaining the same ratio and center distance.

2. The ratio can be changed to use a pinion having a greater number of teeth. This will also affect the center distance.

3. The pinion can be cut oversize and the gear undersize a proportional amount, retaining the same ratio and center distance.

4. The pressure angle can be increased, retaining the same ratio and center distance. (Use smaller base circles).

5. Finally, the pinion can be enlarged by cutting 12 teeth in a blank suited for 13 teeth. This will retain the same ratio, but will increase the center distance.

It will be noted that the gear tooth "hooks" into the flank of the pinion tooth for a considerable distance inside the point of interference, and thus will prevent proper tooth action. The position of the pinion and gear teeth where interference commences is indicated by the dotted outline.

We have up to this point dealt principally with what might be called measurements of the physical dimensions of gear teeth. This in present day practice is only the preliminary stage in accurate gear production and might be considered as simply a means to an end. Much has been learned during the past few years about gear tooth action, and more particularly, the relation of the tooth action to quiet gear operation. There always has been, and still is, considerable mystery surrounding the subject of quiet gear tooth action. Those of us who have been engaged in this work have no doubt had cases where two sets of gears in all of their physical dimensions appeared to be exactly alike, and yet, one pair of gears operated quietly, whereas the other pair was noisy.

Vibration Causes Noise

In an approach to this problem we are, however, assured of one basic fact—noisy gears are the result of vibration. In some cases, vibration is the result of unbalanced forces outside of the gears themselves, and the vibration is transmitted to the gears. In other cases, the gears themselves set up vibrations due to inaccuracies in tooth shape and other dimensions, or as a result of improper mounting.

Our so-called physical dimension inspection will inform us in tenths of a thousand of an inch the variations in tooth elements. It will not, however, give us a satisfactory answer to the question of tooth bearing, its location and area. Today gear experts are paying much more attention to the tooth bearing than they are to any other one factor. Tooth bearing, however, is so closely allied with several other factors, such as pressure angle, tooth shape, axial alinement, etc., that in order to get anywhere, we must of necessity have control over these various factors involved.

If we were dealing with one or two plane surfaces, our problem would be much simpler. Instead, we are dealing with a multiplicity of curved surfaces, and these surfaces are in motion and are contacting each other generally at high speed. If we consider gear teeth simply as levers of unequal length with the fulcrum point at the pitch line, the number of levers being equal to the number of teeth on the gears in mesh, we have a fairly accurate picture of the problem involved. It is generally conceded that the arc of approach should be less than the arc of recession to obtain the best tooth action, and what has previously been said regarding interference, evidently necessitates that the contact of the teeth in no case should

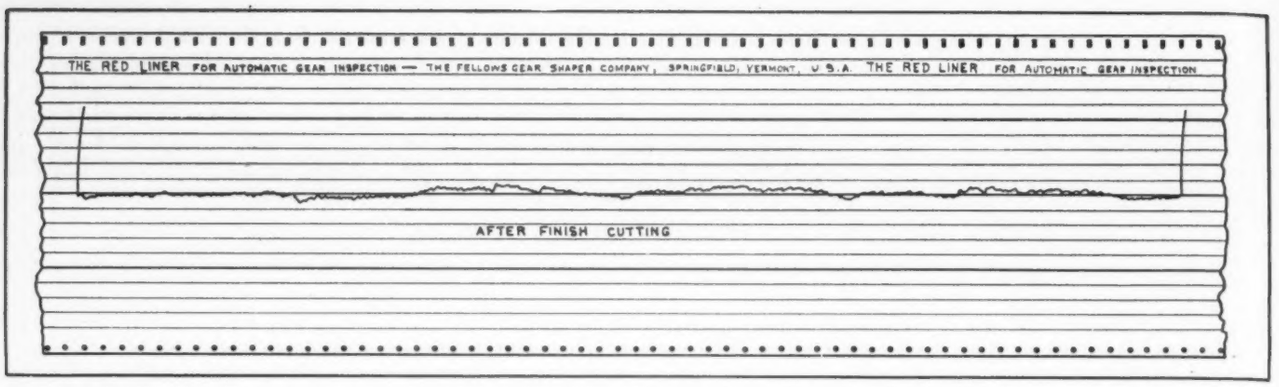

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT, U.S.A. THE RED LINER FOR AUTOMATIC GEAR INSPECTION
AFTER FINISH CUTTING

FIG. 17—Chart of an average gear cut on a gear shaper. The tooth surfaces are not extremely smooth and there are slight errors in circular pitch.

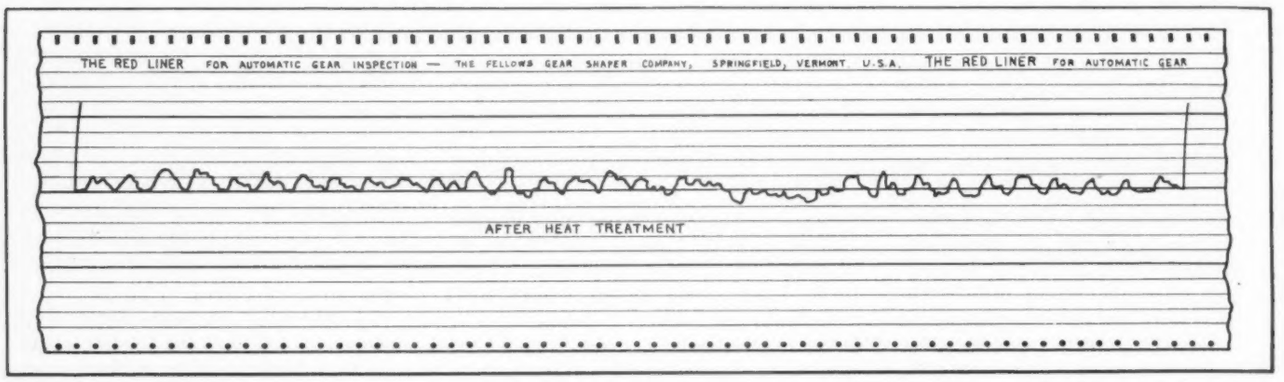

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT U.S.A. THE RED LINER FOR AUTOMATIC GEAR
AFTER HEAT TREATMENT

FIG. 18—Red Line chart of a heat-treated gear. Before it was put in the fire, the accumulative error was 0.001 in.; when it came out, the error had increased to 0.003.

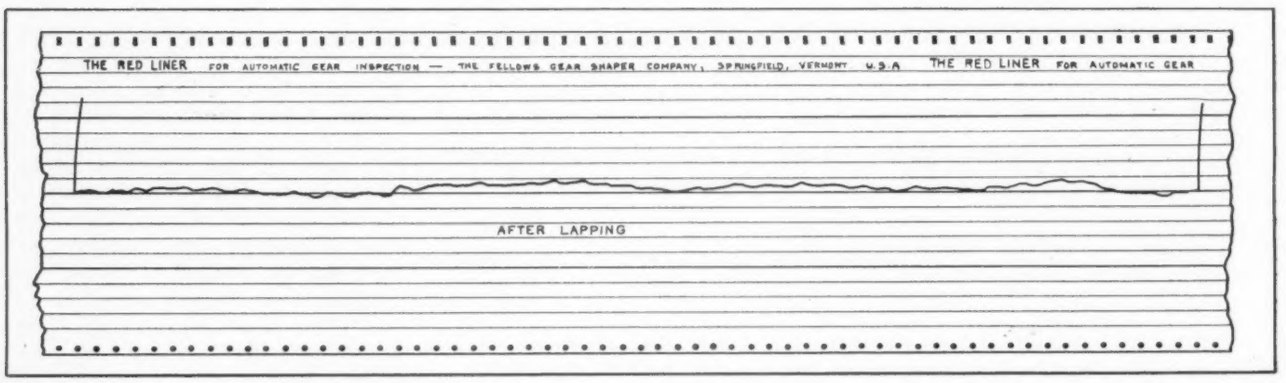

THE RED LINER FOR AUTOMATIC GEAR INSPECTION — THE FELLOWS GEAR SHAPER COMPANY, SPRINGFIELD, VERMONT U.S.A. THE RED LINER FOR AUTOMATIC GEAR
AFTER LAPPING

FIG. 19—Chart of a heat-treated gear that has been brought back practically to its original condition by lapping with an internal gear type of lap. The tooth surfaces are considerably smoother than on the "green" gear.

take place outside the theoretical initial point of contact.

During the past five years, the automotive industry, which is probably the largest producer of accurate gears in the country, has changed over almost entirely from the use of spur gears to helical gears for automobile transmission application. This change was not made because helical gears can be made cheaper. It was made with the object of obtaining quieter action.

If we investigate the action of a pair of spur gears, it would be easy to see that quietness of action is almost impossible to obtain for the reason that just as soon as wear takes place, the tooth shape changes. This is due to the fact that the teeth wear at those points where they slip upon one another, and a spur gear instead of wearing in, wears out of shape. This is not true to the same extent with helical gears, especially when the latter are made so that the advance of the helix in the face width is equal to or slightly greater than the circular pitch. With helical gears designed along these lines, the gears are continuously in contact along the pitch line in some one plane. The result is that the teeth do not have an opportunity to wear out of shape in the same manner as spur gears, and hence, will remain quieter much longer.

Other problems are introduced by the application of helical gearing, in that instead of dealing with

a plain involute surface, we are dealing with a combined involute and warped surface, or an involute helicoid. It is just as important to have the proper bearing on a helical gear as it is on a spur gear for the reason that we can consider a helical gear simply as a multiplicity of laminated spur gears, each lamination being set off in advance of the other to correspond to the helix of a helical gear. In order to obtain full advantage of the virtues of the helical gear, it is necessary that we get tooth contact across the entire face width of the gear or else we do not obtain what is called helical overlap.

Speeder Test

The final test on gears for high-speed operation is known as a speeder test. Mating gears which are to operate together are held on rigid shafts, located at the exact center distance at which the gears will be held when in the assembled unit. One of these shafts is driven by a motor, or some other means, which is so applied that vibration from the motor or the drive are not transmitted to the gears themselves. Usually red lead is placed on one of these gears, and the other is either left plain or coated with Prussian blue. They are then rotated together, both with and without braking pressure.

It is interesting to note in making one of these speed tests that a pair of gears when running light, or without load, may not have a tooth bearing that extends from the base circle to the tip of the tooth, and yet, when a brake is applied to the driven gear, the bearing area spreads out, running closer to the top of the tooth. Attempts have been made to measure the difference in the shape of a tooth when it shows a full bearing under load, and a low bearing running light, but so far no means has been determined to definitely state just what this difference is. It is known, however, that the careful application of a light film of red lead on the tooth will indicate variations of about 0.00005 in. A slight change in the pressure imposed spreads the bearing. Whether this is due to the compression of the material, or to tooth deflection, is a debatable question because even a slight load changes the height of the bearing on the tooth.

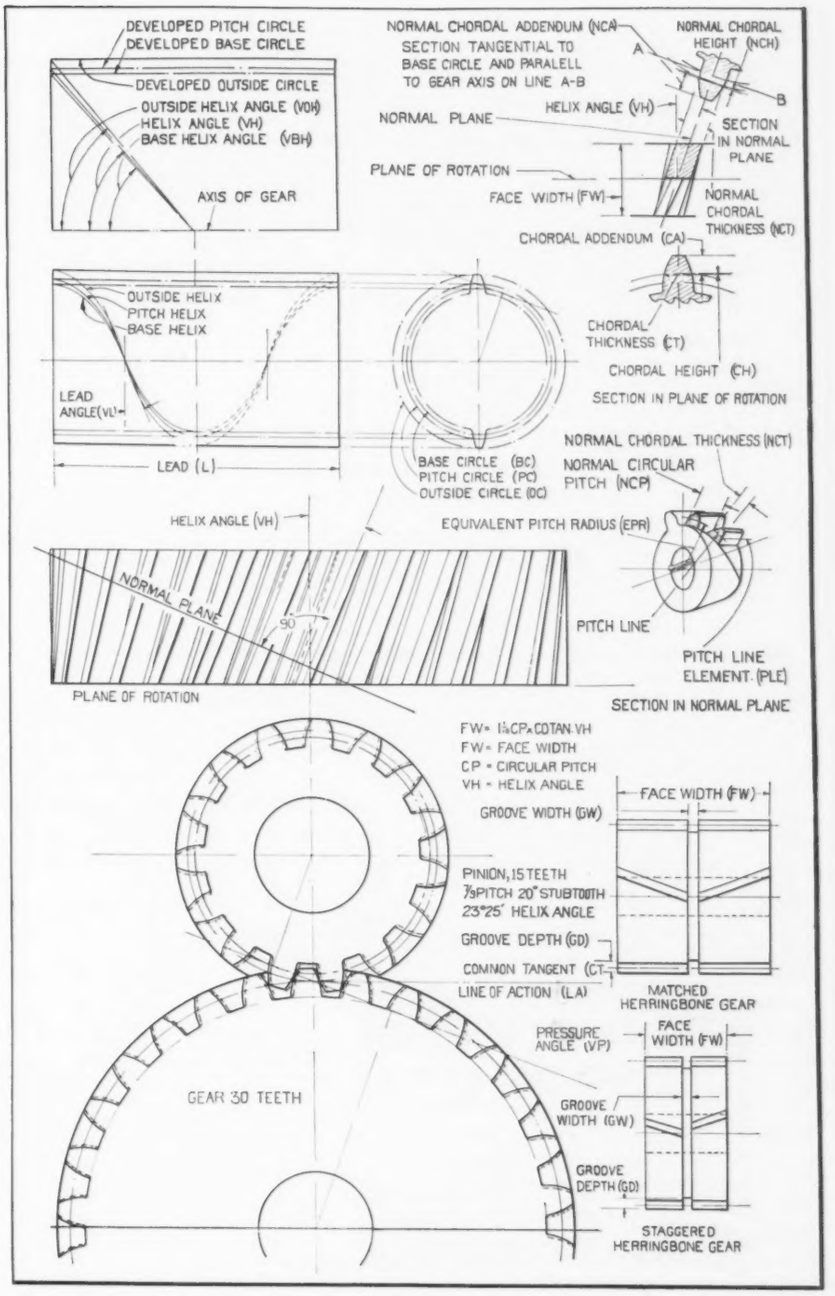


FIG. 20—Because the shape of the tooth in the plane of rotation and in the normal plane is different in a helical gear, the problem of inspection is more complex than for spur gears.

Fig. 22 shows sections of four helical gear teeth indicating what is meant by various kinds of tooth bearing. It is contended by some that by confining the bearing to a full length bearing in the center of the face width, and then letting it taper out gradually toward the ends of the teeth, as shown, so-called "hooking" is avoided. Hooking, it is claimed, results in noisy operation. This may be so, although it would appear that misalinement is more responsible for hooking than is the location of the tooth bearing. It has been demonstrated very conclusively in automotive practice that a helical gear produced so that it gives a full tooth bearing under load on the drive side and a lowered tooth bearing on the coast side is the quietest possible gear.

Gear men have different reasons for wanting the tooth bearing located as shown at *A* and *D*, on the drive and the coast sides of the gear teeth, respectively. It is gen-

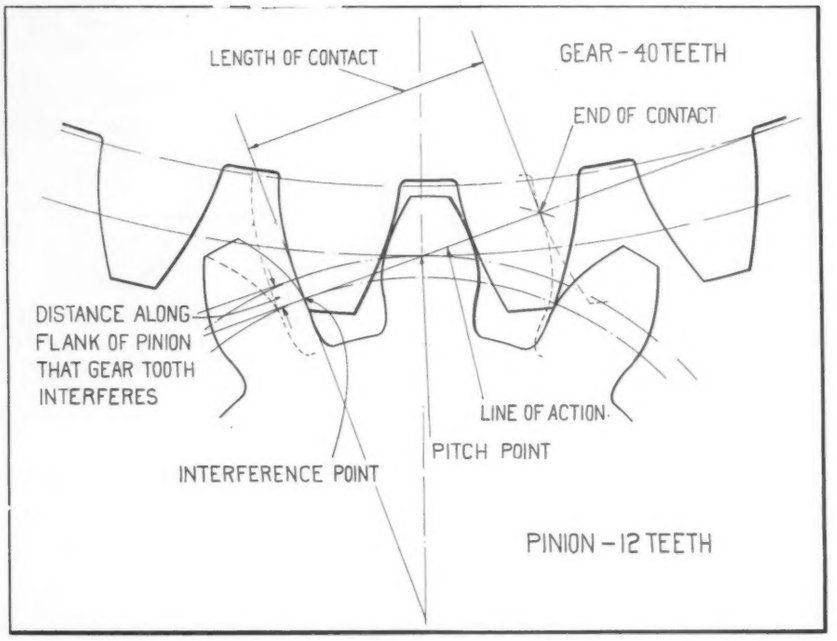


FIG. 21—There are five possible solutions to correct this faulty gear design in which contact takes place in advance of the interference point on the line of action. These solutions are outlined in the text.

erally believed that as the teeth pass through mesh under load, they deflect and interference takes place between the tip of the rear face of the contacting tooth and the forward face of the advancing or mating tooth. If the same amount of backlash, however, was used in helical gears as is customary with spur gears, this might not happen, but as improvements are made in manufacturing methods, the amount of backlash permissible has been gradually reduced so that today about 0.002 to 0.003 in. backlash is a maximum for 8-pitch, full-length tooth gears.

In some cases the permissible backlash is even less. This necessitates, of course, gears that are accurate as to spacing and with a minimum of eccentricity of the pitch circle. If it were possible to make gears absolutely accurate as far as spacing and concentricity were concerned, they could be operated together without backlash except for the question of lubrication. Backlash is introduced largely to take care of manufacturing and assembling errors.

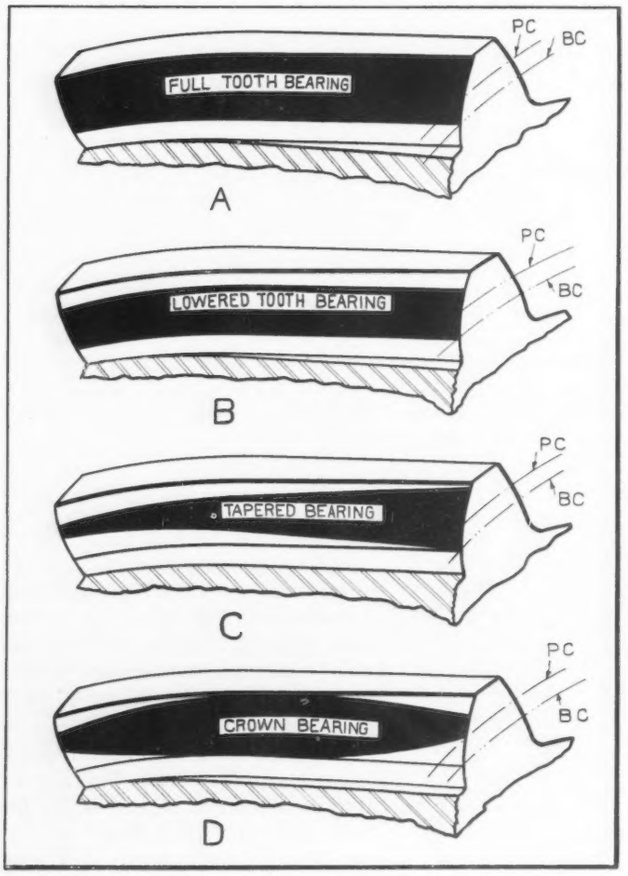


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FIG. 22 — Various types of tooth bearing on helical gears. At *A* is a full bearing extending from the base circle to the top of the tooth, and across the entire face width. At *B* the bearing is lowered by a modification at the tip of the tooth. At *C* a tapered bearing is shown which would indicate shaft misalinement, variations in lead, or differences in pressure angles on both ends of the teeth. At *D* is what is known as a crown bearing, which has recently come into prominence in connection with the production of helical gears.

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Measuring Backlash

Several different methods are used for checking backlash. The common method is to place the mating gears on pins located at the correct center distance and then measure the backlash by use of a feeler gage inserted between the teeth. Another method is to place the gears on pins and bring the teeth into intimate contact and then determine the difference between the standard and the measured center distance. This last check does not indicate backlash directly but it can be determined by the following formula:

$$B = 2 \tan VP \times d$$

In which B = Backlash in inches
VP = Pressure angle
d = Difference between standard and measured center distance.

The third method is to use a dial indicator in connection with a fixture for holding the gears on pins. The gears are set at standard center distance and two readings are taken—one with the teeth in contact away from the indicator, and the other by rotating the gear so that the opposite side of the teeth are in contact. This, of course, measures the movement of the gear and hence the backlash between the teeth.

In checking helical gears, the backlash is measured in the normal plane and not in the plane of rotation.

Tool Engineers Turn To War Production

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"THE Tool Engineer Turns to War Production" was the theme of the semi-annual meeting of the American Society of Tool Engineers held in Toronto, Oct. 16-18, under the auspices of the Toronto and Hamilton, Ont., chapters of this fast growing society. It was the first national meeting of the A.S.T.E. held on Canadian soil. A feature of the meeting was that on Thursday and Friday a dozen firms in the two areas, all making war materials, threw open their doors to the visitors, who came from all parts of the United States, from New Hampshire to California. These tool engineers viewed what is said to be the largest machine gun factory in the world, saw artillery shell cases drawn on hydraulic presses, shell fuses turned on automatics, and optical goods made for range finders. They visited plants making high explosive shell, airframes and propellers, the Enfield rifle, anti-aircraft guns and machine tools.

Everywhere the visitors went, they were impressed with the vast new structures filled with the best of American machine tools, numbering into the thousands. Except for the shell case plant, which was using hydraulic presses built in Canada, few Canadian machine tools could be seen among the vast array of equipment made in the U. S. and even fewer British machines. The machine gun plant had close to 900 milling machines, for example, practically all of one American make. Another rifle plant had about 500 millers of a competitive make. It was obvious to all that Canada has been a tremendous market for American built machine tools in the last two years. To some it appeared, however, that more attention might be paid to special tooling, especially on the milling machines, which in many instances were simply fitted with a vise instead of a quick locating fixture. General purpose machinery is almost universally used and even special set-ups on standard machines are rare at present.

Yet in addressing the banquet on Friday night, the Hon. Clarence D. Howe, Minister of Munitions and Supply of Canada, indicated that the productivity of these American machine tools were far ahead of the productive schedules as given in British manuals, which were used for original Canadian estimates.

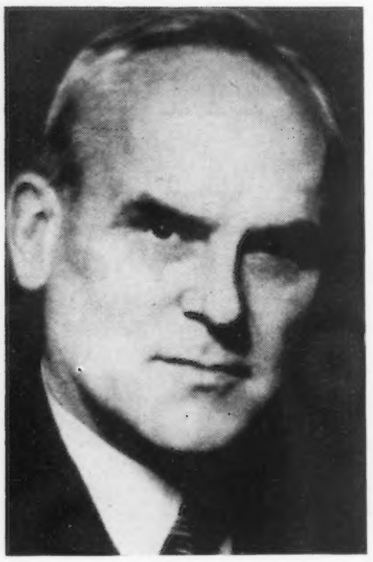
Estimated Output Doubled

"After the machinery has been set up," Mr. Howe said, "we invariably find that the machine tool requirements are excessive and the man-hour estimate much greater than necessary. The result has been that we have been able to enlarge our production greatly over preliminary estimates of output. In some cases, after balancing up of equipment, we have been able to double the estimated output of a given factory."

Explaining that the Canadian machine tool industry itself has been expanded about 600 per cent since the war began, Mr. Howe continued: "We still have machine tool shortages in our factories and we still have buildings ready and waiting for machine tools, but in general I am told that deliveries of (U. S.) tools to Canadian plants are as nearly up to schedule as the position of your industry and its delivery program would warrant. Your record is entirely creditable."

Meanwhile a "bits and pieces" program of spreading work wherever machine tools could be found is being carried out. Machine shops in the mining and newsprint industries, for example, are all doing war work Mr. Howe said, and a continued search is being made for all existing capacity. The Minister also said he was happy to report that any resistance from large subcontractors to subletting work is being broken down and the government is now receiving excellent cooperation. After reviewing the productive capacity of specific Canadian war industries, Mr. Howe said that Canada is now capable of fully equipping a division of troops in about five to six weeks. The great bulk of present production is for export to the theatres of war.

Speaking of the labor supply, the Minister said that the present program is only about 70 per cent manned, but that there are still great reserves of labor to draw on. He then told how in the early part of the war the government established a standard of wages, plus a cost of living bonus, and added: "In general, labor has accepted this basic policy in good grace and has cooperated in working out the



Hon. Clarence D. Howe
. . . Canadian Minister of Munitions and Supply was a speaker.

Arnold Thompson
. . . General chairman of the convention committee.

E. Barker
. . . President, Modern Tool Works, Ltd., was in charge of plant tours.

details without loss of production time. There is little excuse for a strike in any Canadian plant under present conditions. Many of our industries can boast that not one hour has been lost as a result of a strike or lockout in any of its plants."

Mr. Howe was introduced by Alex. Grey, president of the Grey Forgings & Stampings, Ltd., Toronto. Frank W. Curtis, chief engineer, Van Norman Machine Tool Co., and president of the A.S.T.E., presided at the banquet, which was attended by 650 members and guests. Arnold Thompson, president, Tool Engineering Service, Toronto, was introduced as general chairman of the convention committee, as well as all his fellow workers in the two Canadian host chapters.

Used vs. New Machines

Defending the adoption of used machines in war time production, Arnold Thompson, speaking at the first technical session, pointed out that although most manufacturers would like to tool up on war work with new equipment (and this he deemed advisable for the prime contractor) the necessity has arisen for tool engineers to adapt old machine to do a particular job where necessary. On the other hand, he believes that in many instances too much complication has been built into machine tools and that it is not worth while rebuilding complicated machines for war work. Any attempt to use complicated machines that have been discarded usually ends in loss of time and material, he maintained. If need be, such machines can be stripped and rebuilt for simpler operations, but often it is more effective to select simpler machines with simpler tooling, by dividing up the work. Putting unskilled help on such machines will improve them into something better than mere "button pushers."

Mr. Thompson believes that the use of old machines, as is or rebuilt, under the present used market conditions will not serve the purpose. Each used tool should be bought for a specific job with the realization that it must be adapted for the tooling that has been anticipated and the quantity of production required. He suggested that machine tool builders cooperate to keep all used machines off the market, and instead buy them back, rebuild and resell them, or if too badly worn, scrap them.

"We must not overlook the economies of using old machines and the tool engineer should consult with others to determine the economic value of old machines. If proper account is taken of machine burden and amortization, often it will be shown that the overall production cost on an old machine is lower than on a new one, particularly if it is possible to do some simple operation on a low-cost old machine, as compared with an expensive high production type," Mr. Thompson concluded.

Fred C. Dull, vice-president, Monarch Machine Tool Co., after reviewing the tremendous increase in the production of machine tools in the past two years and pointing out the many advantages of special purpose, high production machines, especially in aircraft engine manufacture, urged his audience to do everything possible to adopt old machine tools to national defense production jobs, largely because of the factor of time. "If we had time, it would be far more efficient to wait until tomorrow's new machine tools were built," Mr. Dull said. "But we have no time. Hitler is on the march. England needs aid now. Therefore, every old machine tool which you can help to adopt to national defense production means just that much more time gained today."

Time Is Precious

Time saving, he explained, formerly was a term used in connection with cutting the operating time when the machine was on the floor, and saving production time meant saving in production costs. "Today, time begins right now," Mr. Dull said. "If a manufacturer sits back and waits six months to get a special machine, he is losing

Roy T. Wise

. . . Deputy Machine Tools Controller of Canada was a speaker.

Edward Kennard

. . . Has put emergency training on a scientific basis.

Walter Esau

. . . Had much to say about sulphur in cutting oils.

time. He should begin production on his present machines, adapting them to the purpose and make what he can while waiting for the special-purpose machine. Every bit of production done on old machines is just that more for defense."

In the discussion that followed, Thomas Arnold, Canadian machine tool controller, indicated that the Dominion had to utilize every machine tool it had and obviously had to make use of second-hand equipment. He admited criticism across the border as to the high prices Canada had paid for used equipment in the United States and gave as the excuse the fact that "we must have them." He also noted the large amount of new American machine tools brought into the country, but expressed the belief that if Canada never got another machine tool, it could take care of British war requirements by switching around existing machines now used in peacetime industries. Mr. Arnold indicated great pride in the machine tool builders of Canada who are doing today what they had never accomplished before.

Cutting Tool Problems

In a session devoted to the subject of cutting tools, Roy T. Wise, deputy machine tool controller of Canada, spent most of his talk discussing how milling cutters, which make up 75 per cent of tools in use in Canada today, could be used most effectively. He cited numerous examples where life between grinds had been greatly increased by changing various factors relating to cutter design, grinding practice and proper choice of speeds and feeds. Primary clearance on the land of the cutter, he considered most important, advocating a drop of 0.003 in. in 3/64 in. and the use of a dial indicator to check this clearance.

Another important factor, Mr. Wise mentioned, is the true running of the cutter on the arbor and he pointed out the several common causes of cutter eccentricity and how they could be cured. Spiral angles on slab mills and end mills should be kept as high as possible for long cutter life. Mr. Wise is a strong advocate of climb milling with proper equipment and he showed how cutter life could be quadrupled by changing from conventional milling to this practice and increasing the rate of feed almost three times.

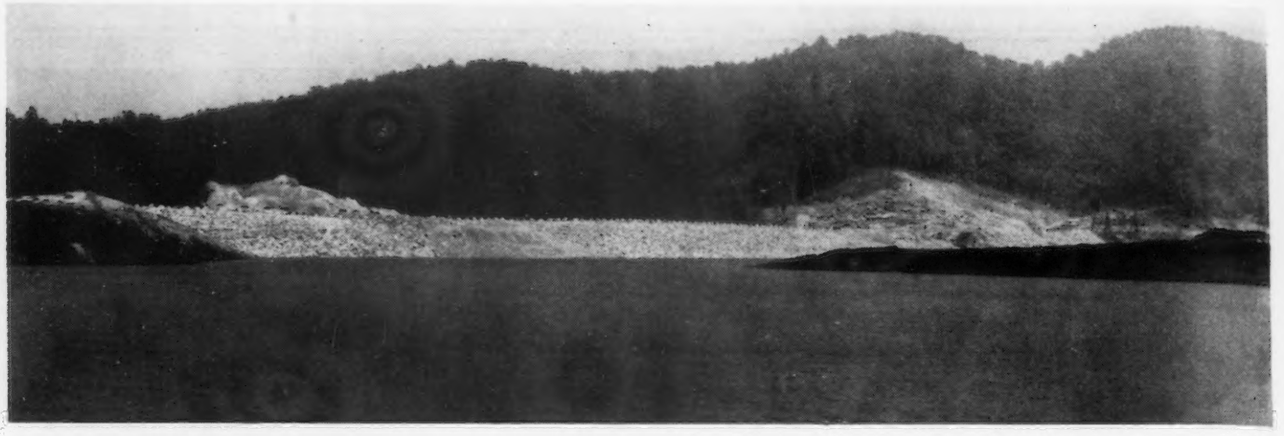
Getting good sharp cutting edges by proper grinding technique was another point the speaker emphasized. A 60-grit wheel, if trued with a sharp diamond will give a smooth edge, but wheels trued with a worn emery stick, a rough star wheel or a dull diamond will reproduce in the cutting edge the irregularities left in the wheel by these faulty dressers.

No Moly Steel Here

Canada, Mr. Wise pointed out, is still using 18-4-1 high speed steel 100 per cent, none of the plants being equipped to heat treat the molybdenum grades. He recommended the conventional heat treating practice for high speed, but cautioned about the necessity of letting the tools reach room temperature after the quench before being put into the draw furnace and also before being redrawn.

Applications of cemented carbides to steel cutting were illustrated by Philip M. McKenna, president, McKenna Metals Co., Latrobe, Pa. He advocated the use of these tipped tools inasmuch as the critical elements, such as tungsten, cobalt, tantalum and titanium, have 50 to 60 times the effectiveness per lb. than the same elements used in solid shank high speed steel tools and could cut at two to six times the cutting speed. Much of his talk was devoted to the properties of Kennametal, an intermetallic compound of the formula $WTiC_2$ which is particularly suited to steel cutting. This material, Mr. McKenna said, is capable of turning hardened high speed steel of 550 Brinell hardness and has found application in making

(CONTINUED ON PAGE 98)



12,000,000 More Pounds of Aluminum

ON Monday, Oct. 13, at Glenville, N. C., the governor of that state pressed a button which put into operation the newest hydro-electric power project of the Aluminum Co. of America. Nestled in the heart of the Great Smokies, on a tributary of the Little Tennessee River, this Glenville plant of the Nantahala Power & Light Co., of Franklin, N. C., will now add 27,000 kva. to the power available for making aluminum in the Alcoa, Tenn., plant of the parent company.

Aluminum is truly an electrical metal as well as a strategic one. Electric power is one of its chief ingredients and the 30,000 hp. now being converted at Glenville will mean the production of 12,000,000 more pounds of aluminum per year.

This Glenville project, now completed, is a part of the Aluminum company's self-financed $200,000,000 expansion program for national defense. When its nearby sister project is completed next spring at Nantahala, N. C., an additional 60,000 hp. will be available for making an additional 24,000,000 lb. per year of this precious metal.

Glenville and Nantahala are both members of the Nantahala Power & Light Co., which is a wholly owned subsidiary of the Aluminum Co. of America. They represent the latest developments in the Aluminum company's long term plan for expanding capacity in the Tennessee Valley district where a plentiful annual rainfall averaging 60 in. assures the continuity of hydraulic power for electrical generation.

The Glenville project in addition to setting a record for construction speed (it was started on last July 1), also has the distinction of having the highest head of any hydro-electric plant east of the Rockies. The drop from water level in the dam to the impulse wheel in the plant is 1150 ft., giving an effective water pressure at the nozzles of well over 500 lb. per sq. in. The length of the pressure conduit bringing the water from the dam to the power house is a little more than three miles. Construction of this enterprise in the time taken is doubly remarkable when one considers the difficulties of such work undertaken in the virgin heart of the Great Smokies.

ABOVE

THIS Glenville reservoir will now supply water power capable of adding 12,000,000 pounds of aluminum to the nation's annual production.

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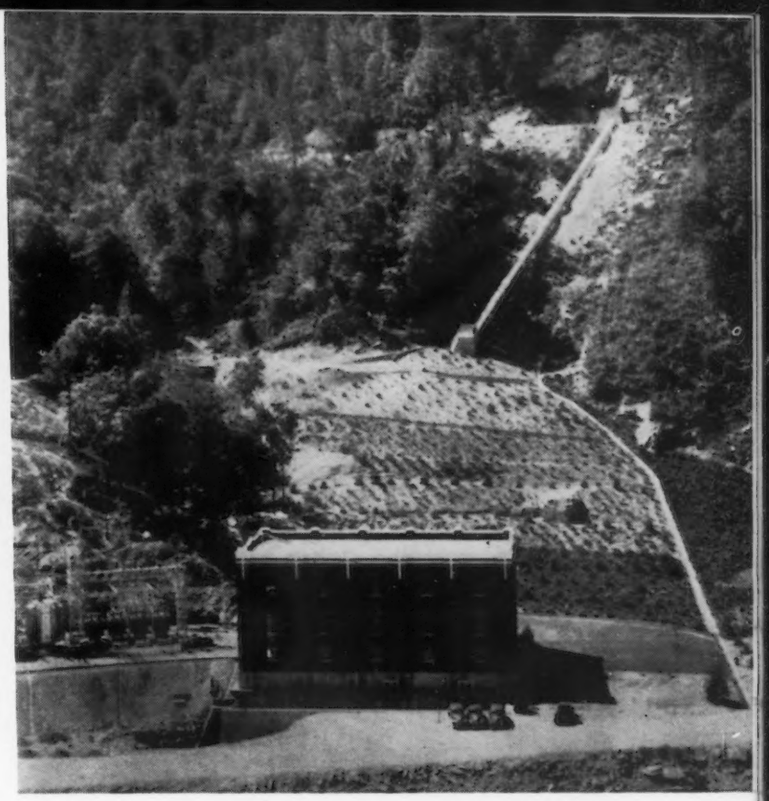
LEFT

NANTAHALA DAM on the Nantahala River in the Great Smoky Mountains of North Carolina. The final depth of water in the reservoir is indicated by the height to which timber on the hills in the background has been removed.



RIGHT

THE Glenville Power House. Hydro-electric power developed by this project is capable of adding 12,000,000 pounds to the nation's annual production of aluminum.

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BELOW

THIS eight-foot diameter steel pipe is part of a three-and-a-half-mile water line from Glenville Dam to Glenville Power House.

Availability of the sites for Glenville and Nantahala was due to the foresight of the Aluminum company in planning future expansion which led it, in 1910, to a survey of power possibilities on the Little Tennessee River and its tributaries and which was followed by the acquisition of riparian rights in this district. Previous to the demands of the defense program three hydro-electric projects had been completed in this district by the Aluminum company for supplying power to its Alcoa plant. These were Cheoah, 24,000 hp., completed in 1919; Santeetlah, 33,000 hp., completed in 1928 and Calderwood, 56,000 hp., completed in 1930.

The Glenville project would have been completed several months earlier had it not been for the strike at the Allis-Chalmers Mfg. Co., which delayed delivery of the impulse wheels and the generating equipment.

In connection with the addition of this first power unit to the Aluminum company's defense program, it is interesting to review what national defense has done to the demand for that metal.

During the first seven months of this year the ingot aluminum production of Aluminum Co. of America equaled its entire ingot production for the year 1939. Domestic production of that company is at present at the rate of nearly 600,000,000 lb. a year, and by July, 1942, it will reach a production rate of 760,000,000 lb. annually.

On Aug. 20, 1941, the Defense Plant Corp. of the Reconstruction Finance Corp. made a contract with Aluminum Co. of America to construct and operate an alumina plant in the State of Arkansas with an annual capacity of 400,000,000 lb. (the capacity probably will be increased to one billion lb.), and three aluminum metal-producing plants, one in Arkansas with an annual capacity of 100,000,000 lb., another in the Portland, Ore., district with an annual capacity of 90,000,000 lb. and a third in Massena, N. Y., with an annual capacity of 150,000,000 lb.

The production of approximately 340,000,000 lb. a year of the plants covered by the contract with the Defense Plant Corp. when added to the production of the Aluminum company's own plants of approximately 760,000,000 lb., will give the Aluminum company an output of approximately 1,100,000,000 lb. annually.

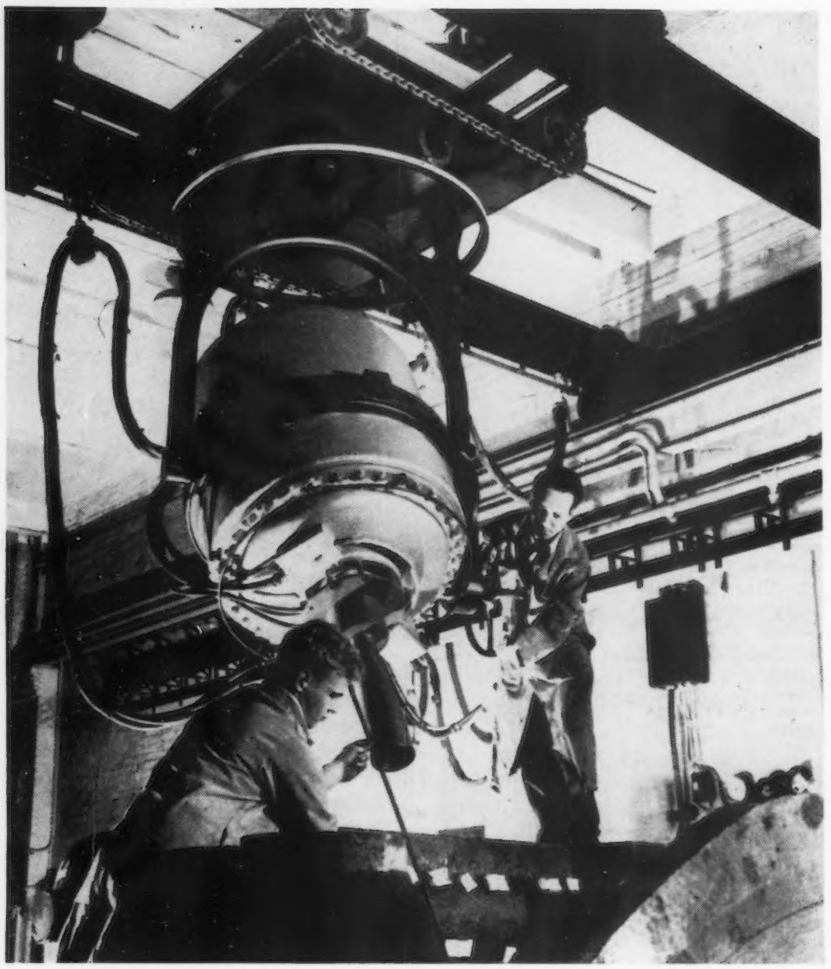
Not only has the Aluminum Co. of America expanded its metal-producing facilities including those for the mining of bauxite, the manufacture of alumina and the transportation of the raw materials to the metal-producing plants, but has greatly enlarged its fabricating facilities as well.

Forging capacity in the plants of Aluminum Co. of America has been increased 118 per cent, and by December, 1941, will have reached a level of 163 per cent above the capacity of September, 1939. Sheet capacity is up 43 per cent, and by the end of the year will be 56 per cent above pre-war levels with plans for continual expansion extending to the end of 1942. Tubing capacity is up 60 per cent and will be raised to 157 per cent by December, 1941. In the case of rolled wire, rod and bar, capacity is now up 100 per cent, and by the end of the year defense expansion in the commodity will be 190 per cent. By December, 1941, extrusion capacity will be 138 per cent above pre-war level; sand casting capacity is now 130 per cent greater and will be increased to 218 per cent by the end of the year.

While expending approximately $200,000,000 to expand plants and facilities, the Aluminum company has, as a result of increased output and improvements in manufacturing operations, been able to make four price reductions. The latest, reducing the price of ingot aluminum from 17c. to 15c. a lb. is the lowest price in the history of the Aluminum company.

Welds in 5

X-Rayed i



POSITIONING the new G-E 1,000,000-volt X-ray equipment in preparation for radiographing a heavy steel casting.

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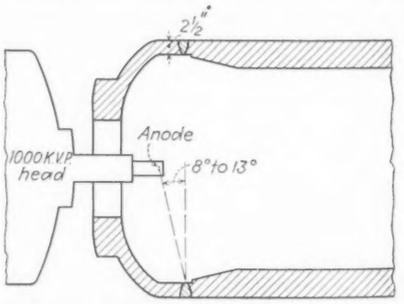
UNTIL a few months ago, in inspecting welds in heavy pressure vessels it was taking 7½ hr. to make an X-ray picture of 12 linear in. of 5⅜ in. thick plate. Today, 24 linear in. of such thickness welds are being taken in 15 min.—a reduction in time of 60 to 1. This notable advance in X-ray technique has been made possible by the development in the General Electric research laboratory of a 1,000,000-volt equipment, involving a new type of tube, a radically new type of transformer and the application of a gaseous insulating medium. The net result is a relatively compact, self-contained unit that is as readily maneuverable in an industrial laboratory or shop as the well-known dentist model is in its sphere of application.

General Electric is using the new equipment at its Schenectady plant to X-ray steel castings, Babcock & Wilcox and Combustion Engineering Co. are examining welded steel boiler drums with this apparatus and Ford Motor Co. is using its 1,000,000-volt machine for examining weldings and castings, particularly cast steel crankshafts for aircraft engines, which are being "shot" six at a time in a fraction of the time used before to X-ray with 400 kv. equipment. Representatives of all these companies recently explained the advantages and application of this apparatus at a symposium held at Schenectady. In addition to these installations, preparations are now being made to install similar apparatus at the Granite City, Ill., plant of American Steel Foundries Co., the Norfolk and Washington navy yards and at the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

As the illustrations show, the outfit looks like a dentist's X-ray model on a larger scale. The transformer and tube of the 1,000,000-volt equipment is housed in a steel tank 3 ft. in diameter and 4 ft. high. Including the cooling chamber on top and a 2-ft. extension, the overall height is only 7 ft. The weight is 1500 lb.

The first novel development making this compact unit possible is the use of Freon (dichlordifluormethane) under pressure of 75 lb. per sq. in. as an insulating medium in place of oil. The dielectric strength of this refrigerant is three times as great as the purest transformer oil and 15 times as great as dry air. The heat transfer problem inherent in gas insulation was solved by a small cooler consisting of finned water-cooled copper tubing over which the gas is circulated by a fan.

The second novel development is the use of a resonant transformer without iron core. By the introduction of suitable capitance in connection with the normally high inductance of the large secondary coil, a resonant system is obtained which has the same natural frequency as the thin flat primary coil, which is placed under the high voltage inductance coil. With this



APPROXIMATE position of anode target for X-raying girth seams in heavy boiler drums. The entire seam can be X-rayed in one exposure, replacing the much slower radium technique for circumferential seams.

5-In. Plate in 2 Min.

EACH accelerating intermediate electrode of this multi-section X-ray tube adds 84,000 volts potential to the electron steam emanating from the cathode at the upper left. Target is in the tube extension at the lower right. The first 1,000,000-volt tube built was 14 ft. long and 1 ft. in diameter.

form of "feedback," by the application of a relatively small amount of power at low voltage (4 kw. at 220 volts), the secondary voltage can be swung up to 1,000,000 volts. The high voltage coil is only 30 in. high, 18 in. in outside diameter and consists of thin coil elements stacked upon one another. Altogether there is 238 miles of wire in the secondary. The high voltage terminal on top of the transformer is a rounded brass spinning 6½ in. high and 18 in. in diameter. The stack is held together by glass tie rods.

The power frequency chosen for resonance of the primary coil is 180 cycles per sec. and is supplied by a synchronous motor-generator.

Further compactness is obtained by centralizing the X-ray tube within the air-core transformer, where it is located in a uniform electric field and a weak magnetic field parallel to the tube axis. The tube itself is novel in that it is a multi-section type. Instability of conventional high voltage tubes is largely caused by field currents produced by electrostatic forces which are powerful enough to pull electrons out of cold metal surfaces. To better control this field emission problem, Dr. W. D. Coolidge, now director of the G-E research laboratory, several years ago began the development of the multi-section Xray tube. Intermediate electrodes placed between the cathode and anode provide a better distribution of the potential gradient across the tube and also permit a pre-determined and controlled potential limit that could be placed on each section of the tube. By this basic principle of design, an X-ray tube for any voltage can be designed, merely by increasing the number of sections of the tube. A multi-section tube is particularly well adapted for use with the resonant transformer mentioned above.

In the 1,000,000-volt tube, besides the electron emitting cathode and a copper backed tungsten target mounted in the lower end of an extension chamber, there are 12 accelerating cylindrical electrodes. These intermediate electrodes are joined to the glass envelope of the X-ray tube with Fernico ring seals, a material with a coefficient of expansion comparable with one of the borosilicate glasses so that a tight seal can be obtained between glass and metal rings and vacuum maintained indefinitely. Small toroidal shields of a conducting Textolite

Approximate Technique for 1000 K.V.P. Industrial X-Ray Unit 1/4 in. Lead Filter Between Film and Cassette Single Film Viewing

Thickness In.	Kilovolt Peak	Milli-Amps.	Time in Minutes			
			60 in. F. D.	48 in. F. D.	36 in. F. D.	32 in. F. D.
1⅛	890	0.5	1.00			
1½	890	0.5	1.50			
2⅛	950	1.5	1.50	1.00		
2½	950	1.5	2.75	1.75	1.00	
3⅛	950	1.5	5.00	3.20	1.80	1.25
3½	950	1.5	6.50	4.20	2.30	1.60
4½	1000	3.0	6.00	4.00	2.10	1.70
5	1000	3.0	11.00	7.00	4.00	3.00
5½	1000	3.0	18.00	12.00	7.00	5.10
6	1000	3.0	35.00	21.00	11.00	9.00
6½	1000	3.0	58.00	37.00	20.00	16.00
7	1000	3.0	100.00	68.00	35.00	27.00

Data by courtesy of Combustion Engineering Co.

are used around all the Fernico seals to reduce the field strength at the ring edges, to aid the focusing action of the intermediate electrodes and to provide contact points for the tap strips which connect the intermediate electrodes to the inside of the transformer coil. The tap connections fix the potential of the electrodes at 84,000 volts for each station and allow d.c. charges to flow from the tube electrodes.

A focus coil is provided outside the tank to focus the electron beam onto the tungsten target. The focal spot diameter may be chosen to correspond to the tube current, which may be adjusted up to 3 milliamp. The cathode filament power is derived from end turns on the high voltage winding and is controlled by means of a variable reactor operated by a pilot motor.

Because of the high energy imparted to the rays, most of them pass through the tungsten target and emerge in the direction in which the tube is pointed. With these high potential rays, an X-ray picture can be taken through 5 in. of steel in 2 min. A 400,000-volt tube, the next smaller size, requires 3½ hr. to do it. In most industrial uses, the tube and the tank with it, is aimed like a gun at the casting or welded structure to be examined and the X-ray film is fastened to the other side. It is possible, however, to take pictures from rays emanating from the side of the target, such as for X-raying a circumferential girth weld in a boiler drum. Heretofore, this method of radiographing girth seams has only been permissible in connection with the use of radium. The complete seam can be taken with one exposure with the tube extension placed as shown in the line drawing. Maximum radiation is obtained through the weld when the anode is displaced some 8 to 13 deg. out of the plane of weld.

The accompanying table shows the approximate technique for the 1000-kv. X-ray unit as worked out by the Combustion Engineering Co. for thicknesses varying from 1⅛ to 7 in. and for focal distances of 60, 48, 36 and 32 in. This technique is based on using a ¼-in. lead filter between the film and cassette, and on single film viewing. The exposure times are somewhat longer than without filter, but the definition is greaty improved. The use of an oscillating bucky grid, which greatly lengthens the time of exposure, is not necessary with this high potential equipment.

New Method in Aircraft Construction

SUCCESSFUL results after more than a year of use in the mass production of high performance airplanes of the Airacobra pursuit ship class, together with an intensive test program which began early in 1940 under the supervision of the United States Army Air Corps, have caused Bell Aircraft Corp., Buffalo, to announce its intention to license to other manufacturers a new method of attaching fabric to control surfaces of airplanes.

The Bell method of fabric attachment employs the use of a special tool which forces thin metal retainer strips into extrusions in the rib construction, thus holding the fabric covering tightly in place. Only a slight pressure is required to place the metal strip and the fabric is held permanently without danger of tearing.

Extensive savings in production costs, increased speed of production, the use of unskilled labor, and a stronger attachment than conventional fabric attachments are the direct benefits gained from the use of this new method. Tests conducted by Bell, under Air Corps supervision, proved the increased strength of the attachment, as well as the fact that additional pressure applied to the tool gives a tighter bond without marring the fabric.

No holes are made in the fabric and patches are not required over the retainer. Time studies show savings of about 75 per cent over conventional stitching procedure and 50 per cent over the sheet metal screw attachment systems now available. Investigations indicate that this method may have broad applications in other types of industrial assembly.

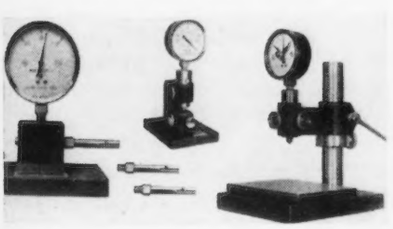
THIN, curved metal strips are cut to length, laid over extrusions in the rib construction of airplane control surfaces, and pressed into place with a special tool. Bell Aircraft Corp. developed this method of fabric attachment and plans now to license its use to other airplane manufacturers.

New Equipment . . .

Small Tools and Gages

Many of this variety of small tools, gages, tool accessories, and other handy gadgets may aid manufacturers of National Defense parts by saving time, labor, and materials

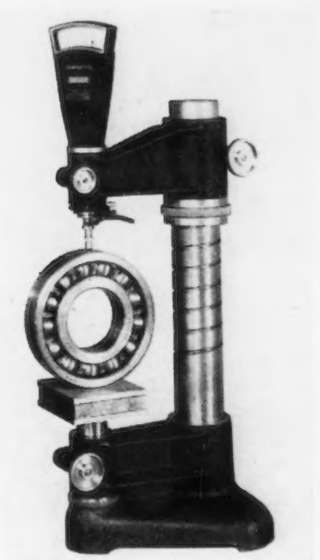
A PNEUMATIC comparator gaging method has been developed by the *Moore Products Co.*, 3629 North Lawrence Street, Philadelphia, that accurately amplifies small dimensional differences and instantly shows these changes on a dial type indicator. With variations in the size of the work piece, the clearance from the nozzle is changed, permitting more or less air to escape from the nozzle, changing the pressure and indicating on the dial in decimal



parts of an inch. The new gaging method is suitable to production work as the wear factor is eliminated and the operator does not require the sense of feel. Where it is desired to record the actual measurements, a circular chart recording meter is used instead of the indicating dial. This feature is particularly valuable for long bore measurements, such as gun tubes and recoil cylinders where measurements are made for each inch of length and where the inspection department desires a permanent record.

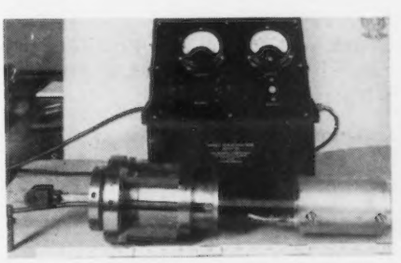
Comparator Gage

THE new heavy duty Model 8 Comparitol, designed by *George Scherr Co.*, 128 Lafayette Street, New York, handles large precision work up to 8 in. in diameter, and eliminates operator feel and skill in making close tolerance inspections. A simple patented knife-edge lever system is employed. The model has a 2½ in. diameter column, a heavy holder bracket to hold the measuring head and a 4 x 4 in. hardened steel, accurately lapped table to handle large work. The base is rigid and sturdy with a three point contact. The Comparitol is not affected by vibrations and is used to check and inspect plug gages, bearings, pins, ball bearings and other parts and may be obtained with scale reading to 0.0001 or to 0.00005 in.



Straightness Indicator

AN induction type device for indicating eccentricity in tubes and gun barrels has been introduced by *Baldwin Southwark Division, Baldwin Locomotive Works,*

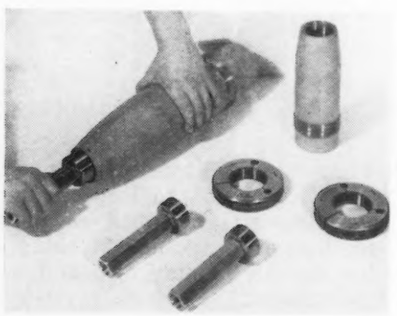


Philadelphia, and is known as the Haskell gun bore straightness indicator. This self-contained unit is designed to be fitted to the ends of a gun barrel while the barrel is being straightened in a press, and sizes are offered for gun barrels from 37 mm., upwards. Accessories provide for its use with a number of bore diameters, the maximum number being fixed by the facilities available for handling and rotating large gun barrels. The device will detect an eccentricity of 0.005 in. or less, depending on the

concentricity of the roller tracks at the ends of the bore. An induction head is moved in steps through the bore while it is rotated about the head at each step. An electrical circuit detects eccentricity by variations of the magnetic gap between the pole pieces of the induction head and the wall of the tube. The Haskell straightness indicator operates on 110 volt, 60 cycle, a.c. power supply.

Shell Thread Gages

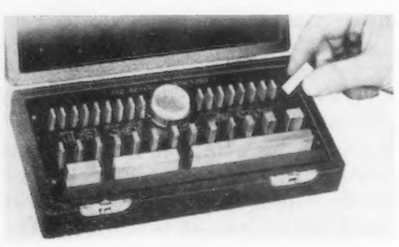
DETROIT TAP & TOOL CO., 8432 Butler, Detroit, recently introduced a line of high precision thread gages for checking both internal and external



threads on various sizes and types of shells. Made of a high wear-resisting alloy developed especially for this purpose, the gages are precision ground and lapped with precision ground thread-laps. Plug gages for internal threads are of the reversible type, while ring gages are adjustable and may be reconditioned and re-set when worn with the use of setting-gages.

Precision Gage Blocks

THE *GEORGE SCHERR CO.*, New York, recently announced their Ultra-Chex Inspectoset, consisting of 34 gage blocks which will make up about 80,000 combinations in steps of 0.0001 in., from 0.300 to 8 in. The blocks come in five series; nine blocks from 0.1001 to 0.1009 in.; nine blocks from 0.101 to 0.109 in.; nine blocks from 0.110 to 0.190 in.; four blocks from 0.100 to 0.500 in., and three blocks of 1, 2 and 4.000 in. An optical flat used for checking gage blocks, micrometer anvils and other lapped surfaces for parallelism and planeness is furnished with the Ultra-Chex Inspectoset.



A.C. Tachometer

FOR use in measuring r.p.m., ft. per hr. or gal. per min., where rotating equipment is used, a new a.c. tachometer was recently announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. The tachometer has an a.c. generator and a rectifier type voltmeter. No brushes or commutators are used in the generator, which is a permanent magnet, a.c. inductor type. The rotating element is laminated iron, keyed to a rust resisting steel shaft. The alternating voltage is rectified by a Rectox unit in the voltmeter, calibrated depending on the application. The tachometer is recommended for operation over a range of from zero to 500 r.p.m., and accuracy is ½ per cent of full scale.

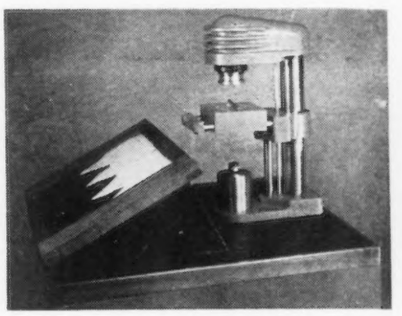
Rubber Micrometer

BY eliminating contact pressure in measuring thickness, the Carson rubber micrometer, made by *Instrument Specialties Co., Inc.*, Little Falls, N. J., can measure soft or compressible materials with the

same degree of precision and accuracy obtained with precision measuring instruments on steel parts. When the micrometer tip of this instrument is brought in contact with a metallic rider resting on the work, exact thickness at time of contact is indicated by a green light before any pressure is applied. This indicator works by a special electronic circuit operating on a new "currentless contact" principle, sensitive to displacements as small as 0.000005 in.

Optical Projector

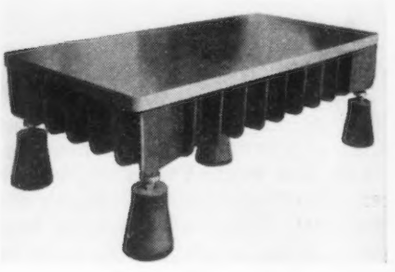
A NEW optical projector has just been marketed by the *Portman Machine Tool Co.*, Mt. Vernon, N. Y., especially suitable for measuring, inspecting and comparing small tools in tool room, laboratory, or production departments. Objects to be examined are simply placed on the work rest member of the stage, eliminating the need for numerous staging or holding fixtures. Among the features em-



bodied by this projector is the utilization of the Acton optical system, permitting the ready change of image magnifications. The projector is available with the plain type stage unit or with a coordinate stage unit consisting of movable members for sidewise and forward travel, with dial indicators reading in 0.001 in. for rapid visual detection. The reflected image is projected on a clear ground glass screen. Standard magnifications available range from 10 to 100.

48 x 96 in. Surface Plate

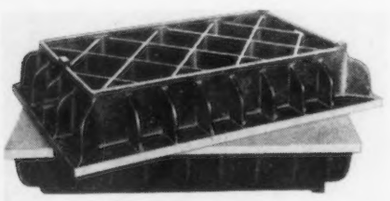
SOUTH BEND TOOL & DIE CO., South Bend, Ind., offers this surface plate, cast in semi-steel and finished plane within 0.005 in., with seven support points. Two sizes of adjustable blocks or legs, 10 and 12 in., provide possible working



surface heights between 29 and 33 in. The blocks support threaded 1½ in. screws, each topped with a circular cap which is recessed to contain any of the projecting support points on the bottom of the plate. The 12 pitch thread provides fine adjustment to compensate for floor irregularities. The surface plate weighs three tons.

Master Plates

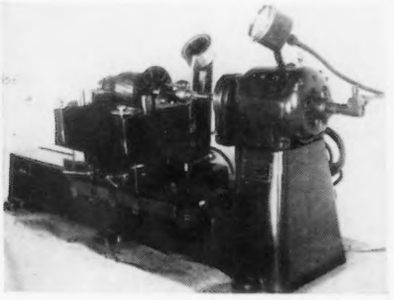
TOOL ENGINEERING SERVICE CO., INC., 243 Washington Avenue, Nutley, N. J., is now marketing a line of Reid master plates for use in laying out work, for inspection and in assembling in



precision aircraft, armament and gage work. These master plates are thoroughly normalized and weather seasoned and are guaranteed as to accuracy. Heavy and closely spaced fins or webs outside the main underframe give rigid support to the edges, in addition to the heavy webbing within the main underframe, which has three-point support. These plates are available in standard sizes from 12 x 18 in. to 48 x 72 in. They may be had either planed or scraped.

Balancing Machine

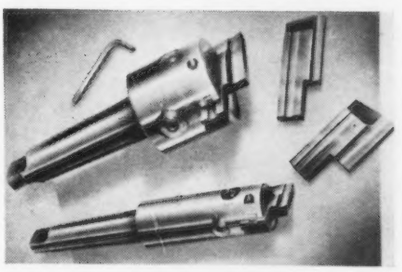
THE NE-2 Globe Supersensitive Dynamic Balancing Machine, designed by the *Globe Tool & Engineering Co.*, Dayton, Ohio, determines the amount and location of the corrections required in overcoming the unbalance in rotating parts ranging from 5 to 50 lb. The Micro-Indicator dial on each



balancing head indicated and records the correction necessary in its respective correction plane. The angular location is indicated and recorded by the Neon-Lite head, and about 30 sec. is required by the average operator to determine the condition of unbalance and the necessary corrections on a typical rotating piece. The unbalance on one plane is locked out, while reading is being made in the other plane. Without stopping the machine, the locking point can be shifted to the first plane while reading the unbalance in the second. Shafts from ⅜ to 1⅜ in., in diameter, can be accommodated in the standard arbor, but larger sizes may be handled by extra saddle adapters. The heads are adjustable along keyways, providing for shaft lengths between 5 and 26 in. Speeds from zero to 5000 r.p.m. are available.

Boring Tool

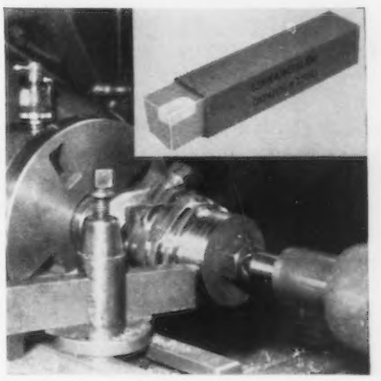
WITH the B & B spotfacer and boring tool, made by the *Bokum Tool Co.*, Detroit, it is claimed that more accurate work can be done with fewer motions in less time, and heavier cuts can be made. The tool consists of a head with a cutting blade running through a slot at the end at right angles to the length. On the head is a dial with micrometer readings



which permit the operator to set and lock the blade to the desired diameter within 0.0001 in. The tool is made in three models with standard blades, providing a range of boring diameters up to 22 in. A small adapter placed on the tool makes it suitable for boring small holes, and by using the blades with step formation, different diameters may be bored and steps or shoulders may be faced at the same time. The tool will bore to exact diameters and face bottoms perfectly square and flat.

Steel Cutting Carbides

MCKENNA METALS CO., Latrobe, Pa., announces improvements in its various grades of Kennametal steel cutting tool carbides. New hardness and strength values for the four standard grades of Kennametal, KM, KH, K3H, and K4H, vary from 77.6 to 80.6 Rockwell C and from 225,000 to 350,000 lb. per sq. in. Grade KM is used in lathe and boring tools for machining alloy steel and carbon steel forgings, casting, and bar stock for continuous and interrupted cuts. It is exceptionally strong, and can be used for shaping armor plate. Grades KH and K3H are used on light finish-



ing cuts, and K4H is extremely hard and is used for precision boring of steel with light cuts.

Composite Tool Blanks

A NEW line of electrically welded composite steel blanks for making dovetail forming cutters for use on automatic screw machines has been introduced by the *Forging and Casting Corp.*, Ferndale, Detroit. The blanks are made by a special electric welding process which joins a cutting face of high speed steel to a non-hardenable base of mild steel, reducing by at least one half the quantity of high speed steel required for a tool. Important among the advantages claimed for this tool is that the mild steel base minimizes the inherent tendency of solid high speed steel tools, during heat treating or because of excessive strain when working, to break or crack at the sharp dovetail corners or at the screw holes where the tools are attached to holding fixtures.

Magnetic Chucks

BROWN & SHARPE MFG. CO., Providence, has added a new large size magnetic chuck to its line. While of the same design as other rectangular chucks of the permanent magnet type, it differs

in that it has a working surface of 12⅛ x 36 in., and its magnetic surface is about 9½ x 29 5/16 in. The base dimensions are 12⅛ x 36 in.; length overall with crank in "on" position, 41 13/16 in.; and width, 16 11/16 in., making it suitable for large grinding and slabbing operations. Also a similar chuck which has a hardened top plate has been added to the Brown & Sharpe line, the hardened top plate making the chuck especially useful for work that may scar or mar the surface of a regular chuck.

Impact Wrenches

INGERSOLL-RAND CO., Phillipsburg, N. J., recently introduced two new lightweight air-operated impact wrenches, sizes 504 and 508. Size 504 will handle nut sizes up to and including ⅜ in., while size 508 will handle nuts from ¼ to 1¾ in., and both wrenches are reversible. They are designed with the patented Pott principle which localizes the steel-to-steel impact without transmitting shock to other parts of the tool, and can

be operated with one hand and in confined spaces because of their short overall length and small nose diameter. Illustrated is the size 508.

Air Drills

DEVELOPED to reduce the time required for heavy duty close quarter work, the Thor No. 377 Class rotary pneumatic close corner drills, reversible and non-reversible types, were recently an-

nounced by the *Independent Pneumatic Tool Co.*, Chicago. The drills are governor controlled and have a rotary type motor which eliminates chatter and permits the cutting of clean, smooth, full strength threads.

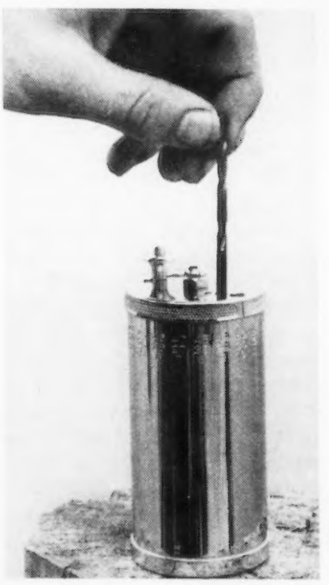
Hydraulic Vise

A NEW hydraulic vise, said to offer considerable saving in time and labor, has been announced by the *Studebaker Machine Co.*, Chicago. Capable of developing pressures up to 5 tons between the jaws, the new vise is designed to speed up small press and cutting

operations and has a wide application on production lines, in tool rooms and for maintenance. The vise is operated by foot controls and is self-sufficient, needing no outside power. The foot pedal pump arrangement is in a pedestal on the floor, which is connected with the vise by a steel tube which carries the hydraulic fluid to a ram behind the movable back jaw, the front jaw being stationary. Stepping on one pedal moves the vise jaw to contact the work, a second pedal applies the pressure up to 5 tons, and a third pedal releases the jaw. The vise mounts horizontally or vertically, and can be operated on a portable stand as a movable, self-contained unit. Special jaw faces can be applied. Two sizes of this vise are available, 5 and 7½ in. between jaws.

Drill Case

THE cylindrical case shown, 5 in. high and 2 in. in diameter, is designed to hold drills, Nos. 1 to 60. Each drill is in a separate



compartment and is instantly available by turning the knurled top to the correct drill number. The container is sold by *Burbridge & Sons*, Kenosha, Wis., and eliminates a time-wasting search through a box of drills, "miking" for correct size, and loss of drills.

Wrench Set

A NEW set of box wrenches with double hexagon openings and heads placed at 15 deg. angles was designed by *Bonney Forge & Tool Works*, Allentown, Pa. Known as the No. 36 set, it has two short and four long wrenches, each with a different size opening at each end. They are drop-forged of Bonaloy steel, heat treated, chrome plated, and have polished heads.

Tool Cabinet

A HANDY steel cabinet of drawers recently introduced by the *Standard Pressed Steel Co.*, Jenkintown, Pa., provides individual drawers for safe keeping tools and other equipment. These cabinets can be made with any

number of drawers, drawer sizes being 20 x 20 x 6 in., and can be supplied with cylinder locks or provisions for padlocks. The cabinet illustrated is 52 in. high.

Storage Cabinets

THE *Lyon Metal Products, Inc.*, Aurora, Ill., introduced an efficient individual storage of tools, records, or personal effects for workers on two and three shift operations. These two and three drawer units may be furnished on work benches, tool stands, shop desks, and under counters. Drawers slide easily and have flat key locks.

Rotary Table

A NEW 7 in. rotary table, sold by the *Machinery Mfg. Co.*, Vernon, Los Angeles, has been put into quantity production. The low

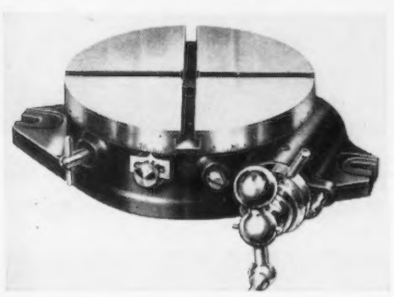


table level, only 2¾ in., affords maximum working space; each of its four quadrants is graduated from zero to 90 deg.; and its friction loaded worm dial is calibrated into 240 min., insuring instant and quick setting. Table movement is registered against an adjustable point, and a worm gear is hobbed integrally with the table, readily disengaging to permit free wheeling of the table. A thumb-screw type lock assures positive setting.

Box Wrenches

THIS new type of wrench, recently added to the line of superwrenches made by *J. H. Williams & Co.*, 225 Lafayette St., New York, is adaptable for heavy work in close quarters where large nuts must be set up tight or frozen nuts loosened. The offset head provides ample nut clearance. The wrenches are drop-forged, chromium-molybdenum steel, heat treated to withstand shock loads, and come in 10 sizes with 12-point openings, ranging from 1 1/6 to 2¾ in., for U. S. standard nuts ⅝ to 1¾ in.

Tool Packaging

A MOISTURE proof cellophane bag was designed by the *Dobeckmun Co.*, Cleveland, Ohio, for

packaging small tools and parts. This bag affords quick identification both by the printed face and the fact that it is transparent, protects parts from rust, reduces storage space and weight of shipping containers, and is tamperproof.

Pneumatic Chuck

THE Airgrip Chuck division of the *Anker-Holth Mfg. Co.*, Port Huron, Mich., announce its new improved Model D Airgrip ball bearing, revolving air cylinder, suitable for use in connection with chucks, jigs, and other machine tools. Wear is automatically taken up by the air pressure, eliminating manual adjustment. The cylinder, approved by the American Standards Association, is made in standard sizes from 3 to 20 in. in diameter and both a semi-finished adapter and Airgrip operating valve are supplied.

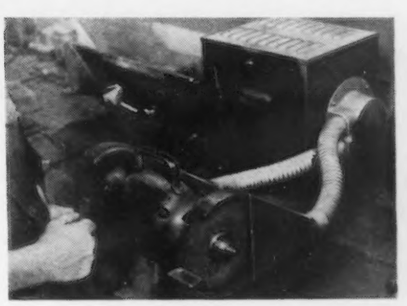
Steel Stamps

NEW METHOD STEEL STAMPS, INC., Detroit, has designed a new type of steel inspectors' stamp, facilitating identification of parts. Instead of carrying a variety of designs to

identify individual operators or inspectors, the stamps are numbered from 1 to 99, the numbers being enclosed in identifying shaped borders: one in a triangle, another in a circle, and another in an oval. The stamps come in sizes ranging from 5/32 to 5/16 in. borders, and are heat treated to prevent mushrooming.

Dust Collector Unit

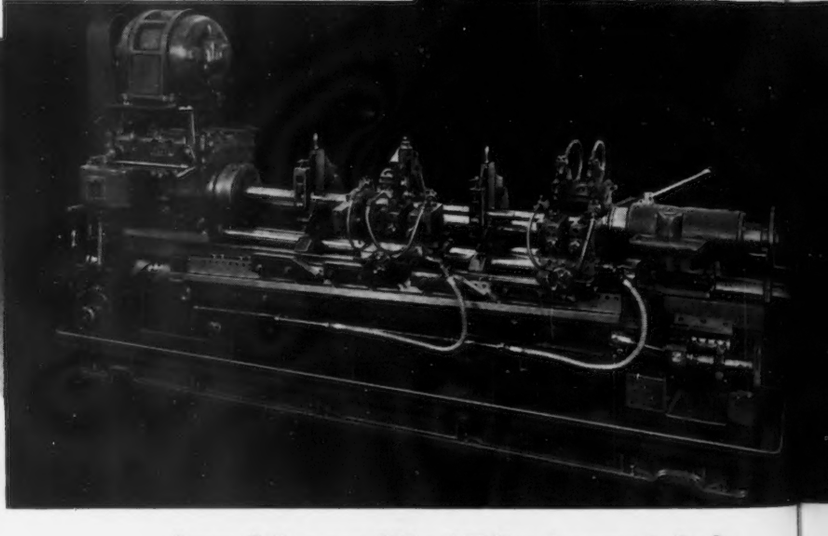
A QUICKLY installed, compact and self-contained portable dust collector to exhaust small wheel bench grinders, surface and tool grinders is announced by *Aget-*



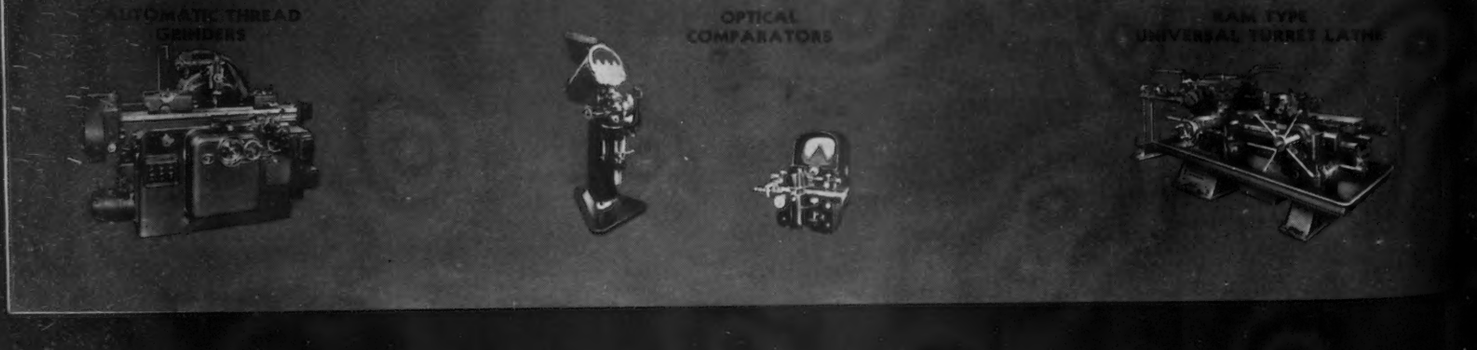
Detroit Mfg. Co., 945 Book Building, Detroit. About a square foot of space is needed for the unit and can be placed on the bench behind the grinder. Spun glass filters are easily and inexpensively replaced.

A Sap-Hole at 12 Rods-

IN 1838 Dr. Story of West Parish, Windsor, Vermont, gave his nephew, young Dick Lawrence, permission to recondition the doctor's old squirrel rifle and mount a peep sight on it. When the job was finished they tested the rifle by firing three shots at a 3/4" sap hole in a maple 12 rods away. Finding no new bullet holes in the tree trunk, the indignant doctor thought his rifle had been ruined — until he discovered to his amazement that all three bullets were in the sap hole itself! Thus Richard Lawrence won his first opportunity to rise to leadership in the gun shop of Nicainor Kendall, early direct predecessor of the modern Jones & Lamson Machine Company.



Jones & Lamson 12" x 81" Fay Automatic Lathe tooled to machine an aircraft cannon.



s- or a Tank at Half-a-Mile

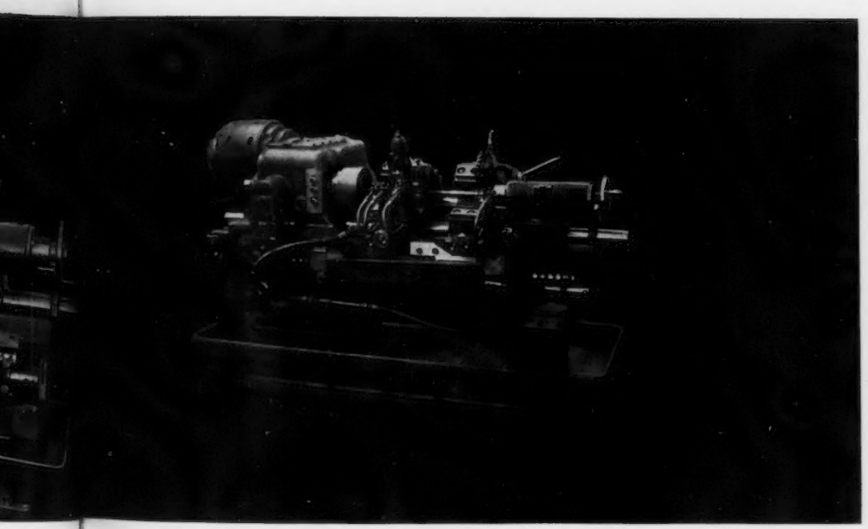
In 1838 it may have been quite a feat to turn out a rifle that would put three bullets in a sap hole at 12 rods, but today's emergency demands accurate machine gun fire at 1500 yards, cannon that can hit a fast moving tank over half a mile away and antiaircraft guns that destroy five-mile-a-minute targets at 20,000 feet.

In any day and time, the technique of producing weapons that hit precisely where you aim them demands similar fundamentals of machine tool engineering and workmanship. Just as Lawrence understood those fundamentals and applied them in his generation, so did Robbins, Hubbard, Howe, Lamson, Hartness and scores of other engineers in Jones & Lamson Machine Company and its predecessor shops.

So do present day Jones & Lamson engineers design equipment that sets new standards of speed and accuracy today. Such are the Jones & Lamson Fay Automatic Lathes, pictured here on multiple tooled precision work on weapon barrels, capable also of cutting costs on peace-time tasks like shafts and spindles.

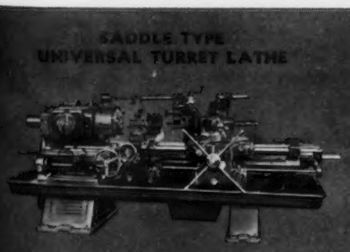
Here is another timely example of why it pays two ways to put production problems up to Jones & Lamson engineers. Why not see what they can do to help you? Inquiries from large plants or small receive thorough study here.

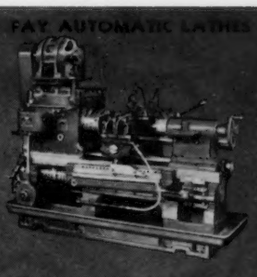
JONES & LAMSON
MACHINE COMPANY · Springfield, Vermont, U. S. A.



Jones & Lamson 8″ x 33″ Fay Automatic Lathe tooled to machine an automatic rifle barrel.

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers





PROFIT PRODUCING
MACHINE TOOLS

Assembly Line . . .

• Strikes, slowdowns cost an entire month's output at Great Lakes Steel Corp. plant . . . Four outlaw shutdowns held in five months . . . Disappearance of deep drawing steels may bring welded fenders.

DETROIT — The label "sabotage" was put on the steel strike here last week by a Federal labor conciliator, James F. Dewey, and there seems to be no disputing the fact. Even the union's leadership disowns the strike, and disowns the strikers. Nine minor union officials, and a clique of about 75 workers "supporting these radicals" are blamed by the Steel Workers Organizing Committee regional organizer, Orval J. Kincaid, for this disastrous shutdown of the two - million - ton - a - year plant of Great Lakes Steel Corp.

The nine officials have been suspended from office and membership by the SWOC, effective last Saturday, after the most recent strike (this was the fourth in less than five months, all unauthorized) had been going on for three days. And SWOC, it says, will offer no support to the nine if the company decides to fire them.

But long before the start of this fourth wildcat strike, facts were marshalling themselves as an indictment of this small group who have repeatedly thrown 8000 men out of work and seriously delayed defense production—and the little-enough civilian production that is still underway. Facts uncovered by THE IRON AGE in the past few weeks, coupled with those now being laid bare by the strike itself, reveal that:

1. More than one entire month's production of steel has been sacrificed since June 1 in these four strikes and an accompanying series of slowdowns in the mills at Ecorse. Delivered tonnage, not theoretical output, is off more than 20 per cent.

2. About 95 per cent of the lost tonnage (prior to the current strike) is attributable to slowdown, rather than shutdown. Until the start of the fourth strike, open hearth furnaces had been down only about 48 hr. in the first strike last June. Blast furnaces had not been interrupted. But these 80 or 85 unionists, now disowned by the union, had slowed down operations enough to cut 20 per cent off the delivered tonnage for four and a half months.

SUPPORTING data come from a variety of sources, but all have been authenticated. Records show that Great Lakes has an annual ingot capacity of a little more than 2,000,000 tons, or about 175,000 ingot tons per month. A net yield of 140,000 tons of finished steel is admittedly high, 130,000 tons being a more reasonable figure for monthly output of finished steel. On that basis, look at the record: Shipments in the three months, June, July and August, were 100,000 tons under the normal total (based on actual shipments in May). This indicates an average monthly loss of 33,000 tons, which continued through September and October, until the strike started last week. Total loss for four and a half months: 148,500 tons.

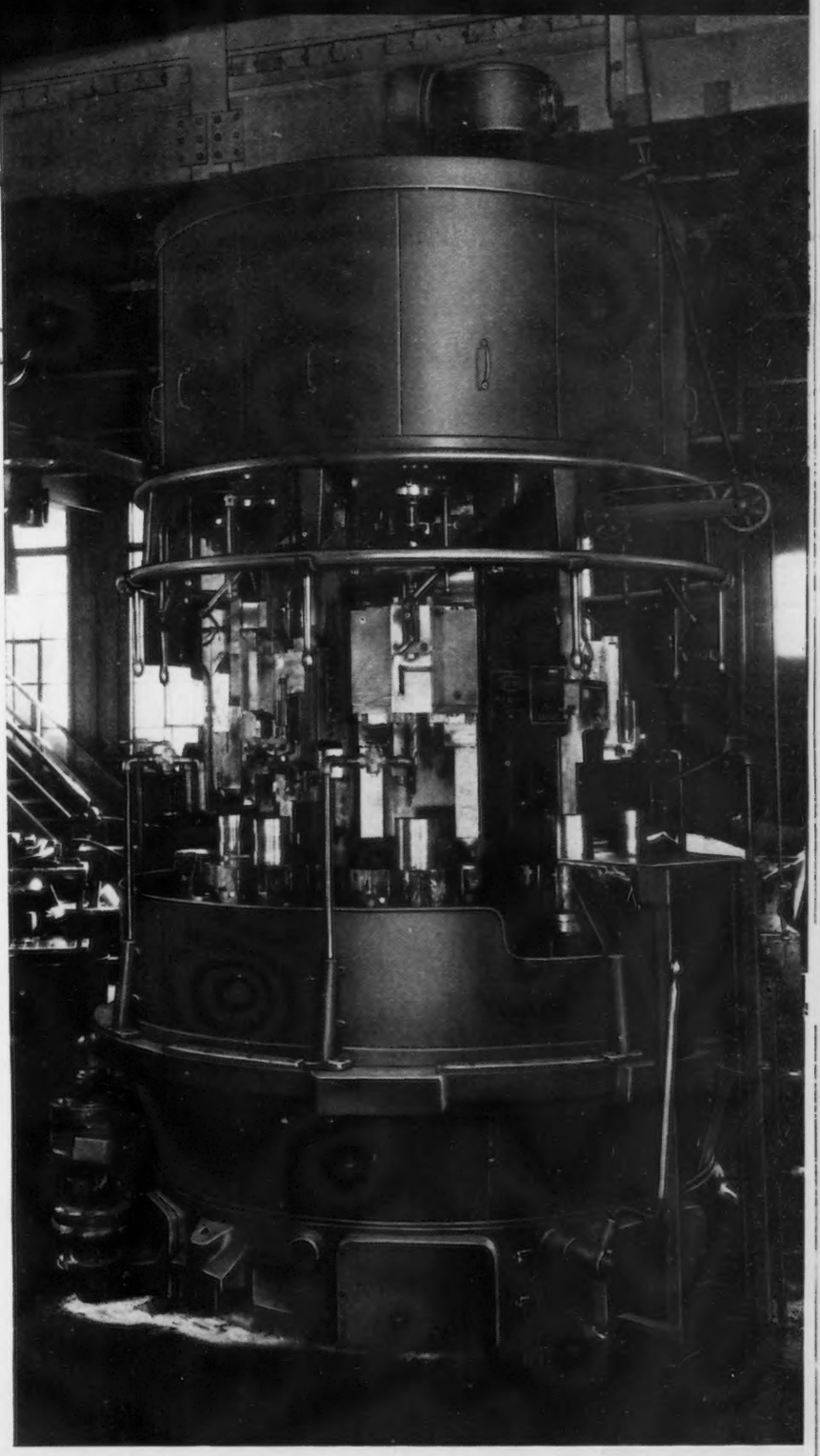
Now the denouement, which is shocking enough to put an entirely new light on the insidious slowdown: 16 open hearth furnaces were out of production about 48 hr. due to the strike in June. At 300 tons each, per day, these could have produced 9600 tons of ingot, equivalent, on the basis used above, to 7200-7800 tons of finished steel for shipment. In other words, only about 7500 tons of steel lost by strike, while about 141,000 tons were lost by the slowdown.

This startling measure of the cost of the slowdown raises the question of how the slowdown works in the steel industry. It starts at the furnaces, with endless fiddling around which causes lost time between heats. Sometimes charging of the furnace is slow, and after the metals are all in, there are unexplained delays in bringing up the various additives. These latter delays many times nearly cause a heat to be lost, and the time required to correct the heat means further delay before the heat can be tapped. And so the output of furnaces is reduced, sometimes 20 to 30 per cent under the maximum potential. In the finishing operations in the mills, the slowdowners contrive other, more familiar, techniques to gum up the works. It is in these departments that the small group at Great Lakes seems to have most effectively plied their cancerous tricks and schemes, in fact a sitdown of a few hours was reported from there during the summer, and at least one of the strikes during the summer originated there.

BY coincidence, just 24 hr. before the strike started, a Great Lakes research engineer spent the evening lecturing to a group of about 50 engineers on the topic "Increase in Production with Existing Equipment." It was C. L. Altenburger, appearing at a meeting of the Detroit district section of the Association of Iron and Steel Engineers. Delving into the chemistry of the open hearth steel producer, Altenburger outlined a half a dozen or more ways in which the nation's steel output could be speeded. Output could be increased far beyond the 10,000,000 additional tons asked by the government—as much as 30 per cent gain being possible — by disregarding cost factors and making some adjustments in specifications, he declared. But this engineer was forced to admit that, in the long run, it does little good to speed chemical reactions in the furnace two hours, if the chemical additives for the job are 3 hr. late because of a sitdown or slowdown.

The technical aspects of Altenburger's informal address are worthy of more than just passing review. Briefly, he said that great increases in steel output are possible by variations of normal, economical practices. He laid down

BEHOLD...
A MODERN JOSHUA!



WE are told that at Joshua's command the sun stood still, so he could gain time to complete the conquest of the enemy. The people called this a "miracle."

But when a Bullard Mult-Au-Matic lops off a third, a half, or three-fourths of the machining time on some job, it isn't called a miracle—it's only "modern production."

By whatever name the process is called, the important fact remains unchanged — the Mult-Au-Matic method of independent speeds, independent feeds and simultaneous operation is probably the greatest time-saving machining method ever made available in a standardized machine tool.

BULLARD

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no general rules, but pointed out that the furnace charge itself can be adjusted to produce quicker results.

For instance, one could charge scrap only into the open hearth, and tap 20 tons per hour, instead of 15 tons. Such extreme measures would not, he admitted, produce steel acceptable to many customers who are used to fabricating steels that meet very rigid specifications; moreover, even if the steel could be made acceptable, we are faced with a scrap shortage anyhow, so the method is merely cited as an extreme possibility.

More practical is the duplexing method, by which open hearth output can be easily doubled. This assumes an excess blast furnace capacity, or construction of more blast furnaces. Such steel, according to the speaker, probably would not be acceptable for sheets because it is high in nitrogen and age hardens quickly. Bessemer convertors—used just as "accessories," but capital investments just the same—can be utilized to speed the output of steel, he pointed out.

Rigid control of silicon content in pig iron in the charge was also advocated. A difference of ten points in the amount of silicon will add two hours to the furnace time, Altenburger declared, and 30 points of silicon in the charge will add 25 per cent to the time. The action of the silicon, he explained, is to unite with oxygen more readily than the carbon in the charge can do so. As a result, the heat "melts high in carbon," in the vernacular of the melter. Silicon, he said, is controlled by treating the molten pig with iron ore or blast furnace cinder and scale.

FURNACES operated on cold pig iron can be made 10 per cent more productive by using burnt lime through the furnace door, rather than limestone on the hearth. He pointed out that the burnt lime is more costly than limestone, but, if the price factor is overruled by urgency of defense needs, the method is applicable.

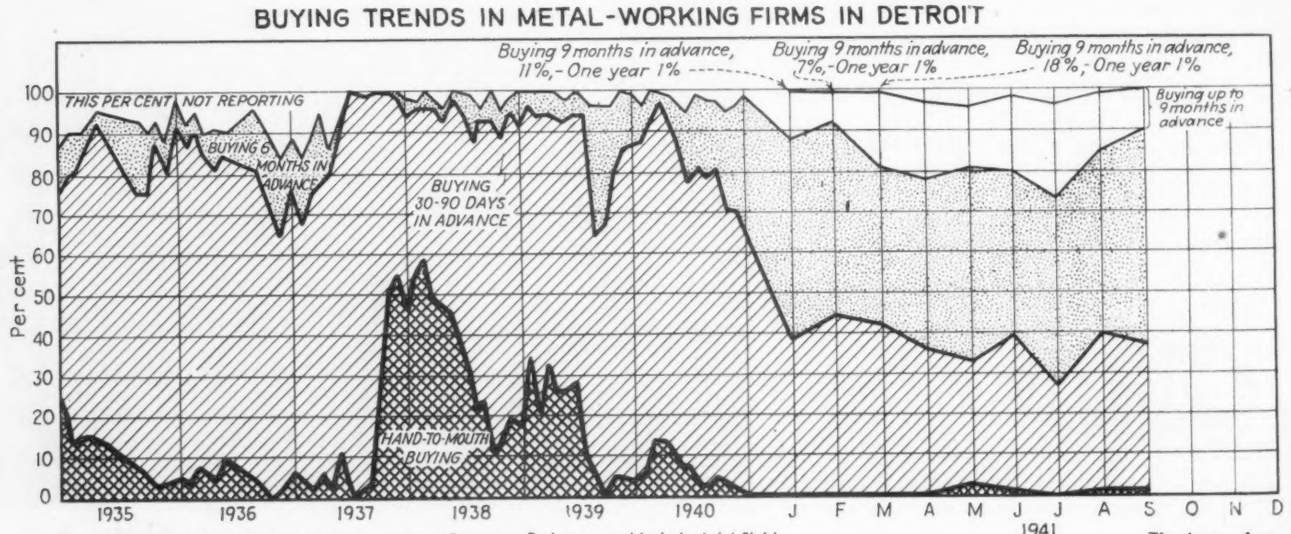
If the silicon content of the charges is constant, a gain of seven percent in steel output can be made by balancing small scrap with large scrap in the charge, he added.

A way for the steel consumer to help out was outlined also at this session. In most instances the consumer has been pampered along for many years and, no matter what kind of a design he has prepared, the competitive steel industry always came forth with a material to satisfy. Thus, in the automobile industry, deep draws became the style. Designing engineers have seemed to delight in submitting fenders that each year stretched steel just a little further. The automobile production departments howled, and jumped on the necks of steel salesmen. They went back to the mills, and put the pressure on there. "Competition" did the same thing. So, eventually, one or more of the mills came across with material that would do the job—usually with 20 per cent or more rejects (sometimes much more at the start of a season). No one knew, or seemed to care, that furnace output was slowed down, and costs upped, by the doctoring and care needed at the furnace and in the mill to produce such special steels.

This year, for the first time, the auto industry is awake to the problem, in some degree, at least. It has been told that aluminum, used liberally to give deep-draw characteristics to sheet steel, may be withheld by OPM. That was a real threat to fender production, so most designers have made preparations for fabricating fenders in several small pieces, to be welded together, if deep-drawing steels disappear from the market. In fact, under the bright metal trim strips of many 1942 fenders you can already feel joints which indicate that some compromise has been made.

In the auto industry, the ending of strikes in suppliers' shops and a successful week at hurdling threatening shortages made possible a gain in auto assemblies to 85,600 units, according to Ward's Reports, Inc. This volume of output of passenger cars and trucks is a high point for the 1942 production season and represents a substantial increase over the output of 79,065 units in the previous week. In the corresponding week of 1940, when there was no OPM curtailment, assemblies totaled 114,672 units.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from PURCHASING AGENTS ASSOCIATION, DETROIT; Data cover wide industrial field, including stove, refrigerator office equipment, steel, auto parts, accessory, auto plants etc.

The Iron Age

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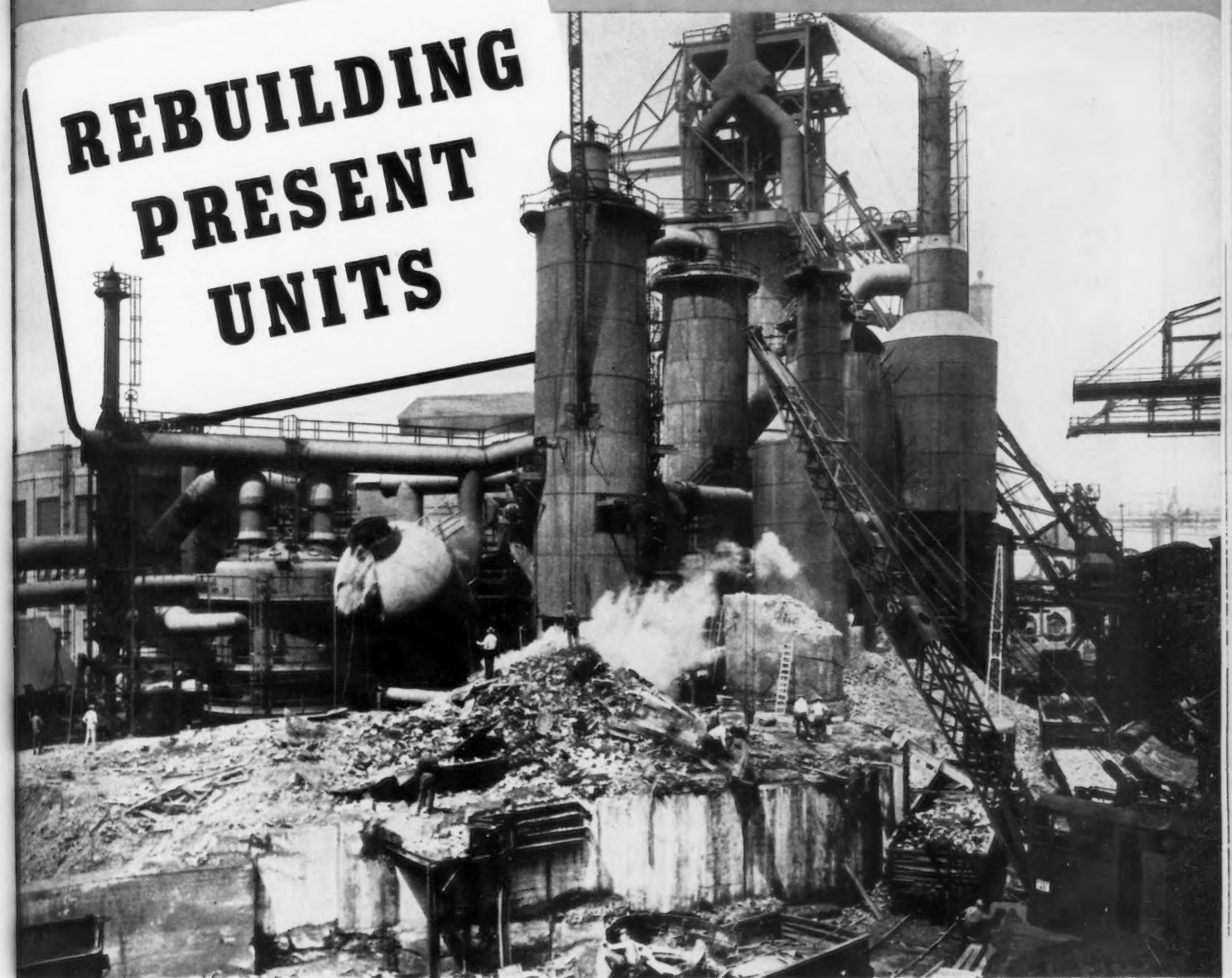

Dismantling existing furnace in preparation for reconstruction

WHILE the defense program is causing the construction of facilities for enormous *new* capacity, most of today's iron and steel tonnage is being produced by *existing units.*

McKee recognizes that the maintenance of present plants at peak efficiency is equally important as the construction of new capacity.

The McKee organization is geared up to give you prompt action on major rebuilds.

In rebuilding existing units McKee can reduce "out of production" time of the unit to a minimum by having all essential material on hand before construction starts, and by using its *own* experienced field organization.

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Washington . . .

• Warehouse order is extremely comprehensive . . . Forthcoming price regulation may be difficult to enforce due to number and variety of products and resellers . . . "Bootlegging of steel" will be struck at.

WASHINGTON — Because steel warehouses already are under OPM's priority control and soon are to be brought under OPA's price control, inquiries are multiplying respecting those who are affected by these Government regulations. The answer is that any person or company who buys steel from a producer and resells it without further processing comes within the category of warehouse control. At the OPA it was stated that regardless of the amount of steel purchased from a producer and resold, the transaction comes under the warehousing classification. Thus the regulation is extremely comprehensive and therefore is not limited, as appears to be one belief, to what are known as wholesalers.

This is made clear not only by the informal opinion given at OPA but also by the official definition in the OPM Priority Division's definition in its order, as follows:

"'Warehouse' means any person who receives physical delivery of steel from a producer for sale or resale in the form received."

THE OPA has discussed plans for price control with warehouse interests and is about to establish a ceiling, and its move in this direction has been expedited by complaints, some of them from well established steel warehouses, that a "small fringe" of steel resellers are gyping on prices. Price Administrator Leon Henderson proposes to crack down on this group and has the warm support of the organized warehouse trade.

When warehouse prices have been fixed, OPA, like OPM, will define the term, and obviously the definitions will carry the same meaning if not identical phrasing. In the meantime, however, OPA's notice of a forthcoming ceiling on warehouse prices shows that the scope of those included by the term is just as broad—and even broader, if possible—as that embraced in the OPM definition.

The Price Administrator, in preparing for a warehouse price schedule speaks of "all iron and steel products sold through jobbers, dealers and distributors." Further than that, Mr. Henderson said a ceiling will be fixed on iron and steel products covered in the producers schedule and "sold in any quantity by mills, warehouses, jobbers, distributors, dealers, agents or brokers." That covers a wide area of resellers of any iron or steel product.

IN some quarters predictions are being made that because of the number and variety of products and resellers it is going to be as difficult to enforce the warehouse price schedule as it has been to enforce the iron and steel scrap schedule. Violations of the scrap schedule, however, are tapering off, it is reported, now that the OPA and the industry itself have organized more efficiently under the schedule. This experience is true of the operation of other price schedules. Therefore, those who do not look for unusual difficulties in controlling warehouse steel prices base their opinion on this experience together with aid which they expect from the organized warehouse industry.

One of the first things that OPA will strike at is what has been called "bootlegging of steel." "Bootlegging" is used to describe the reselling of steel at excessive prices, as well as the sale of "seconds" and "rejects" which it is claimed have been sold at prices considerably higher than those charged for steel of first grade. Because of this, "seconds" and "rejects" will come under the price schedule.

WITH the wiping out of "bootlegging" by a "small fringe" it is hoped that much will be accomplished in the direction of administering the warehouse price schedule satisfactorily. One effective means in mind to shut off the practice is to deny priorities to offenders.

"Since the issuance of Price (producers) Schedule No. 6, which froze producers' prices at first quarter levels, the leading steel jobbers have cooperated admirably with OPM to keep their prices in proper relation to the mill prices set by the schedule," said Mr. Henderson. "In recent months, however, largely because of the great demand for steel generated by the defense program, certain members of the trade have demanded exorbitant prices from manufacturers in urgent need. Numerous complaints have reached my office, citing cases where consumers in need of steel have been compelled to pay prices ranging from 50 per cent to 200 per cent above those generally quoted. In many instances, 'seconds' and 'rejects'—steel containing imperfections—have been sold at prices considerably higher than those charged for steel of first grade.

"This is profiteering, pure and simple, and must be stopped."

IT was pointed out that about 15 per cent of all iron and steel sold by steel mills goes to jobbers, distributors and dealers for resale. The estimate was made that about 11,800,000 net tons of iron and steel will be thus distributed in 1941, against 6,686,000 net tons in 1940.

OPA said that it is estimated that there are over 5000 companies, partnerships, and individuals engaged in iron and steel distribution in the United States. They range in size from large independent corporations, maintaining warehouses and distributing depots in numerous cities and towns, to small neighborhood dealers. Some jobbers specialize in pipes and tubes, others in wire and wire products and others in sheets. Some handle heavy steels exclusively, while still others have extensive inventories containing tens of thousands of items. Several of the large steel producers have subsidiaries engaged in the jobbing business.

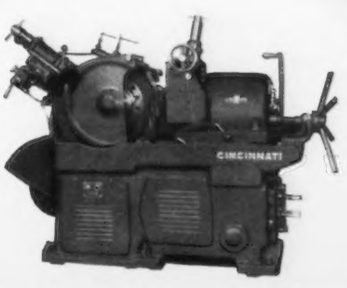
You Don't Need a Toolmaker TO RUN A CINCINNATI CENTERLESS

Operating a CINCINNATI Centerless Grinder is just about as simple as operating household equipment. Once set up, there's little to do other than handle the work. Almost anyone can run the machine. The Centerless is safe, too. As soon as the work contacts the wheels, the regulating wheel takes over the job of feeding the work through the grinding throat (thru-feed jobs), reducing or entirely eliminating the necessity of placing the hands near the wheels.

Coupled with this simplicity of operation are the simple, rigid and compact working elements of the machine . . . FILMATIC Grinding Wheel Spindle Bearings, which never seem to wear out or require adjustment . . . hardened alloy steel gears and shafts . . . principally automatic lubrication.

These two qualifications — simplicity of operation — absence of service requirements — are highly important factors today in solving the production problems of your precision ground parts. The following publications will be of help to you in deciding which additional parts can be ground by the low-cost centerless method.

G-472 "Centerless for Small Lots"
G-456 No. 2 Centerless Catalog
G-438 No. 3 Centerless Catalog



Right: CINCINNATI No. 2 Centerless Grinding Machine. Also built in Nos. 3 and 4 sizes.

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Wide World Photo

CHOICE SCRAP FROM WHITE HOUSE: This pile of copper and brass from the White House basement will be sent to the Navy for conversion into material for defense. Howell Crim, head usher at the executive mansion, is shown examining the treasure. The scrap, consisting largely of copper and brass utensils and electrical fixtures, amounted to about 1000 lbs.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

LET ME HAVE THAT, AN' STEP INSIDE HERE, YOUNG MAN! WHERE'D YOU GET THIS?
I WON IT IN A RAFFLE IN TH' SHOP TODAY-- I HAD TH' LUCKY TICKET
IF I WAS THEM COPS I'D LET HIM OUT WITH THAT THING WITHOUT A WORD! THEY MUST BE RESPONSIBLE FOR LETTIN' SUCH A CANNON GET IN!
NO, THAT OL' CIVIL WAR MUSKET HAS BEEN RAFFLED OFF FOR YEARS HERE WITHOUT EVER LEAVIN' TH' SHOP! AN' NOBODY EVER THOUGHT O' TAKIN' IT OUT TILL WE GOT A NATIONAL EMERGENCY!
T. M. REG. U. S. PAT. OFF. COPR. 1941 BY NEA SERVICE, INC.
THE WRONG MINUTE MAN
J.R.WILLIAMS 10-24

New Priority Orders Cover Tank Making

Washington

• • • **Director of Priorities** Donald M. Nelson on Monday announced two preference ratings extending priority assistance to certain prime manufacturers of component parts, armament and accessories for medium and light weight tanks. The two preference rating orders are P-26-e and P-25-e.

P-26-e complements P-26-a, P-26-b, P-26-c and P-26-d, and assigns the same rating of A-1-d to the delivery of materials for the manufacture of parts, accessories, and equipment for medium tanks; medium and their accessories and spare parts; 37 mm. and 75 mm. guns and mounts for installation in medium tanks, and for gasoline and diesel engines, and engine accessories, for the tanks.

P-25-e extends the priority rating of A-1-f to producers of light tanks. This rating covers the same items as are covered in the medium tank order, with the exception of the armament, which in the case of light tanks consists of 30 caliber and 37 mm. guns. Twelve new contractors now receive this assistance.

August Manganese Ore Output in U. S. 9100 Tons

Washington

• • • **Predicated on reports** from producers who accounted for 84 per cent of the 1940 total, a Bureau of Mines statement says that domestic output of manganese ore containing 35 per cent or more manganese during August was 9100 gross tons. Shipments were 9000 tons and producers' stocks at the end of the month were 1200 tons. In July, 1941, production was 6000 tons, shipments were 6200 tons and producers' stocks at the end of the month were 1100 tons. The rate of shipments averaged 3344 tons monthly in 1940, when the total amounted to 40,123 tons.

Pullman-Standard Ships 1000th Mortar

Chicago.

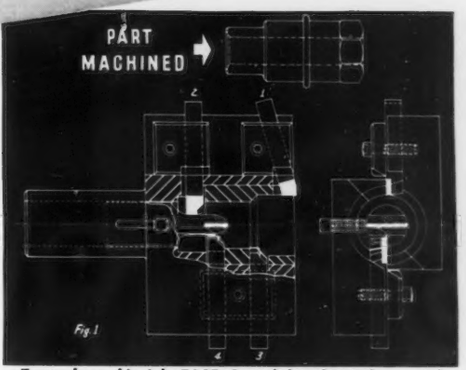
• • • **Pullman-Standard Car Mfg. Co.** shipped its 1000th 81 mm. trench mortar produced here on Oct. 15.

FOR FASTER "Tool-Ups"

Grind your own special shapes from CARBOLOY standard-stock tools

93% of Consolidated Brass Co's Carboloy Requirements

—are adapted—in their crib—from this one style of Standard Tool



To tool-up this job FAST Consolidated grinds special shapes in Style 1 Carboloy Standards. The drill is a standard Carboloy Masonry Drill.

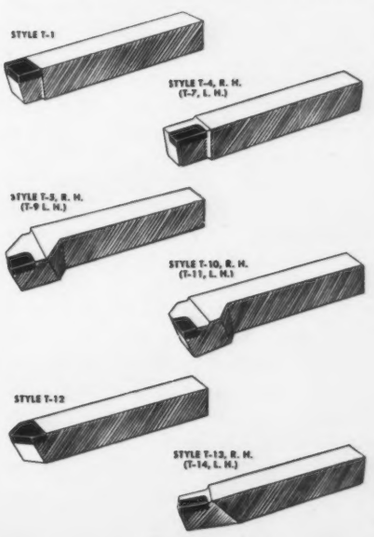
To get the fastest possible service on special carbide tools, many leading plants today are maintaining nominal stocks of Carboloy Standard Tools and grinding these to meet special requirements whenever necessary.

Carboloy Standard Tools are manufactured by Carboloy in "mass production" quantities and are always available faster than specially shaped tools. Produced in 10 styles, Cabroloy standards can be quickly reground in your tool room for use on 60%-80% of all turning, facing, boring operations on steel, cast iron, non-ferrous metals and non-metallics.

At Consolidated Brass Co., Detroit, for example, a survey showed that one style of "Standard" (Style 1) in just two sizes, was adaptable to 93% of their total Carboloy tool requirements. These are stocked by them . . . ready, at a moment's notice, to be ground to special shapes desired, in Consolidated's tool room. As a result, there are no delays awaiting special tools. Jobs are tooled up FAST, whenever needed.

This may be the answer to faster tool-ups on your jobs. Write for Catalog GT-129.

Use these Carboloy Standard Tools for 60%-80% of all turning, boring, facing jobs.



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CATALOG GT-129

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WEST COAST . . .

• Definite program for shipyard apprentices set up at San Francisco . . . Agreement prevents labor hijacking of trainees . . . Hillman runs into new storm cloud at San Diego.

SAN FRANCISCO — This city, which has so many labor troubles that it is locally known as "picket city," is the first city on the Pacific Coast and probably one of the first in the country in which employers and organized labor have agreed upon a definite program for training skilled labor for defense industry.

Representatives of San Fransisco Bay shipyards and the AFL Metal Trades Council in a single short meeting produced a mutually acceptable program by which shipyard apprentices may be trained in any of the skills in which a labor shortage may occur. Individual unions which are members of the Metal Trades Council must ratify the agreement before it goes into effect, but already three of the bellwether unions have approved it and the rest are expected to follow suit.

The agreement provides that when the local union is unable to furnish qualified mechanics, employers may select men for training from among members of the union employed in his shipyard or shop. Provided those selected are approved by the busines representative of the union, they are trained for such classifications as the demand may require. They are required to attend supplementary national defense training classes for at least four hours each week on their own time, in addition to training on the job. If within 60 working days the trainee fails to show the proper talent or inclination to learn, he is returned to his former classification without loss of time.

UNION members are protected by a provision that no trainee shall be permitted to take the place of any mechanic in the classification for which he has trained and that when the national emergency has passed, or the union states that it is capable of furnishing a sufficient number of qualified men, the agreement shall lapse.

The employer who conducts the training is protected against labor hijacking by other yards by a provision that trainees shall not be permitted to transfer from one yard to another upon pain of losing their favored status.

That such an agreement could be so easily concluded in a strike ridden city is probably due to the local custom of employers bargaining collectively as well as the unions.

In Los Angeles last week, Sidney Hillman, associate director of the OPM, let it be understood that lack of welders was slowing ship production there and that other types of ship workers were in great demand. He blamed this condition on "a lack of adequate cooperation between management and educational authorities," but before leaving town he tacked together a program by which the shortage might be overcome. The plan calls for selection of welding experts from each of the Los Angeles area shipbuilding concerns. This committee will work directly with educational groups.

DURING his travels on the West Coast, Mr. Hillman made a number of speeches packed with platitudes with one exception. In this, he urged San Francisco business men "not to worry about overexpanding in producing for defense. This country has been built on expansion."

Mr. Hillman also made reference to a "stabilization agreement made by the building and construction trades workers with the government to assure that new factories, shipways, Army cantonments and homes for defense workers will be unhampered by work stoppages." Before he spoke, he had turned his back on a jurisdictional dispute which for two weeks had virtually halted work on the two million dollar Rainier Vista defense housing project in Seattle. If he left labor trouble behind him as he proceeded down the Coast, he found a new storm ready to break at San Diego at a luncheon in his honor. There Maj. R. H. Fleet, president of Consolidated Aircraft Corp. declared he would not sign a recent compromise wage agreement with machinists unless the government promised to help defray part of the cost. Maj. Fleet said unless he invoked the escalator clause requiring the government to pay additional costs in the manufacture of planes, his concern would be forced into bankruptcy. As Mr. Hillman stared into his dessert, Maj. Fleet referred to two recent strike threats against Consolidated and complained that the government should "quit kicking the aircraft industry around." When the union heard of Maj. Fleet's remark, it promptly voted a new strike authorization, and as this was written trouble was still brewing.

Initiative in a drive to make certain that small manufacturing firms will not starve for want of materials was taken last week by the Los Angeles Chamber of Commerce when it urged that an allocation program be established by OPM. Those small firms certified as being unable to get defense contracts or unable to convert their facilities to defense work would receive materials provided the amount of critical materials needed bore a reasonable relationship to the number of man hours of employment which would thereby be provided.

LOS ANGELES, probably more than any other city in the United States, has been built up by small industrial concerns.

The proposal may have been hastened by the wobbling of the Chamber's own business index in September which dropped to 122.8 from a record breaking August figure of 126.7. Building permits took a substantial drop from August and were 13 per cent below September of last year. This, particularly, was blamed on priorities. This region since has been accorded preference due a defense area, and building is expected to pick up.

THE extent to which the southern California aircraft industry has been soaring is brought out in figures showing that nearly one-

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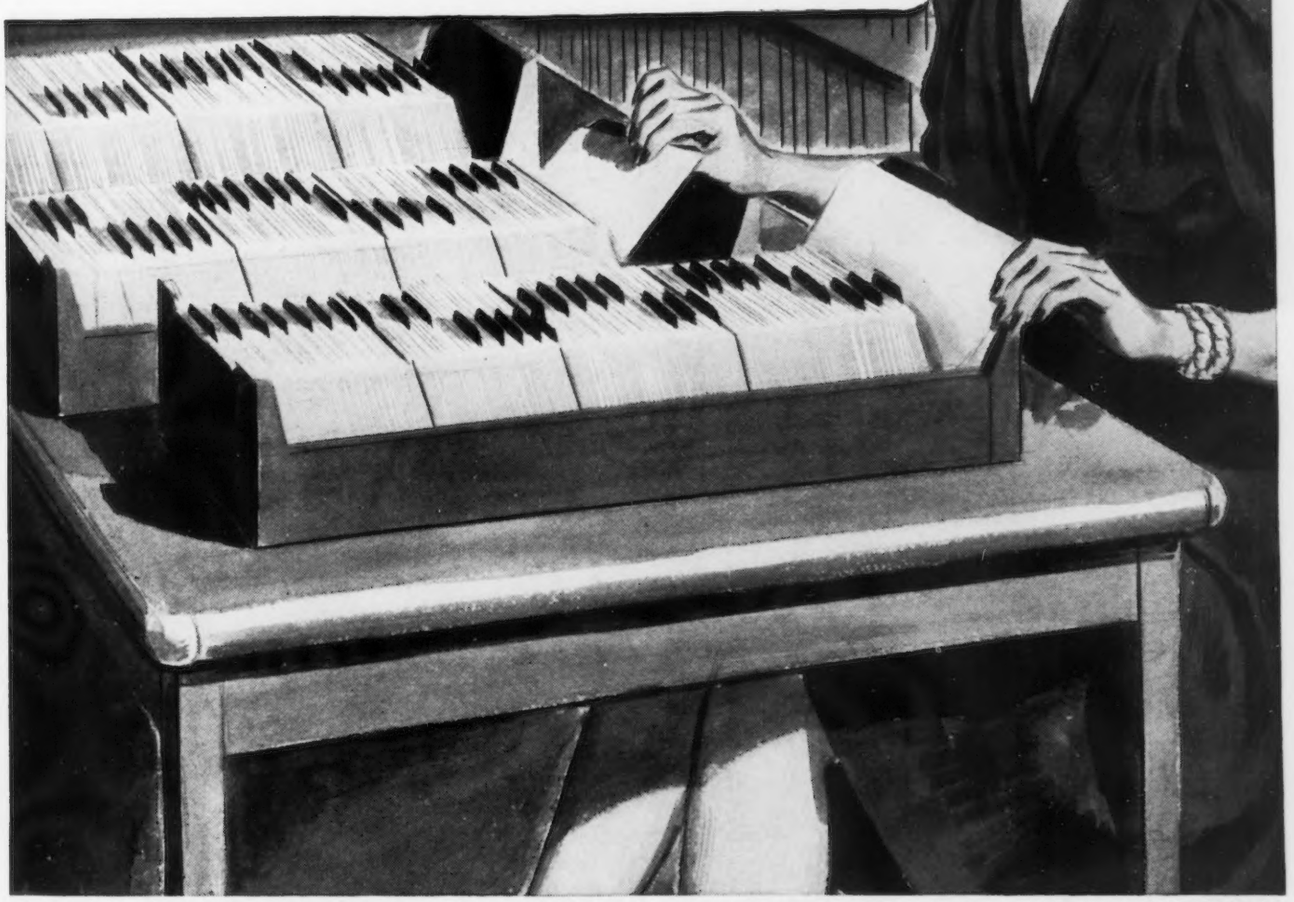
Why not drop us a card asking for list of available literature. Your request for the assistance will receive prompt attention.

NICKEL



THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

third of all plane deliveries made in the United States during the first six months of this year were made by Pacific Coast companies, all of which except Boeing are located in southern California. According to the Aeronautical Chamber of Commerce of America, $617,345,086 worth of airplanes, engines and propellers were delivered in the first six months of 1941, of which Pacific Coast companies delivered approximately $200,000,000 worth.

Consolidated Aircraft Corp., San Diego, reporting for the eight months ended Aug. 31, said its deliveries for the eight months were nearly six times the total volume for 1940. Unfilled orders for this firm at the close of August stood at $755,867,898, compared to a backlog for the aircraft, engine and propeller industry as a whole of nearly $6,000,000,000.

Vultee Aircraft, Inc., made the largest single delivery of military planes in history Saturday, turning over 123 basic trainers to the Army, Navy and Marine Corps.

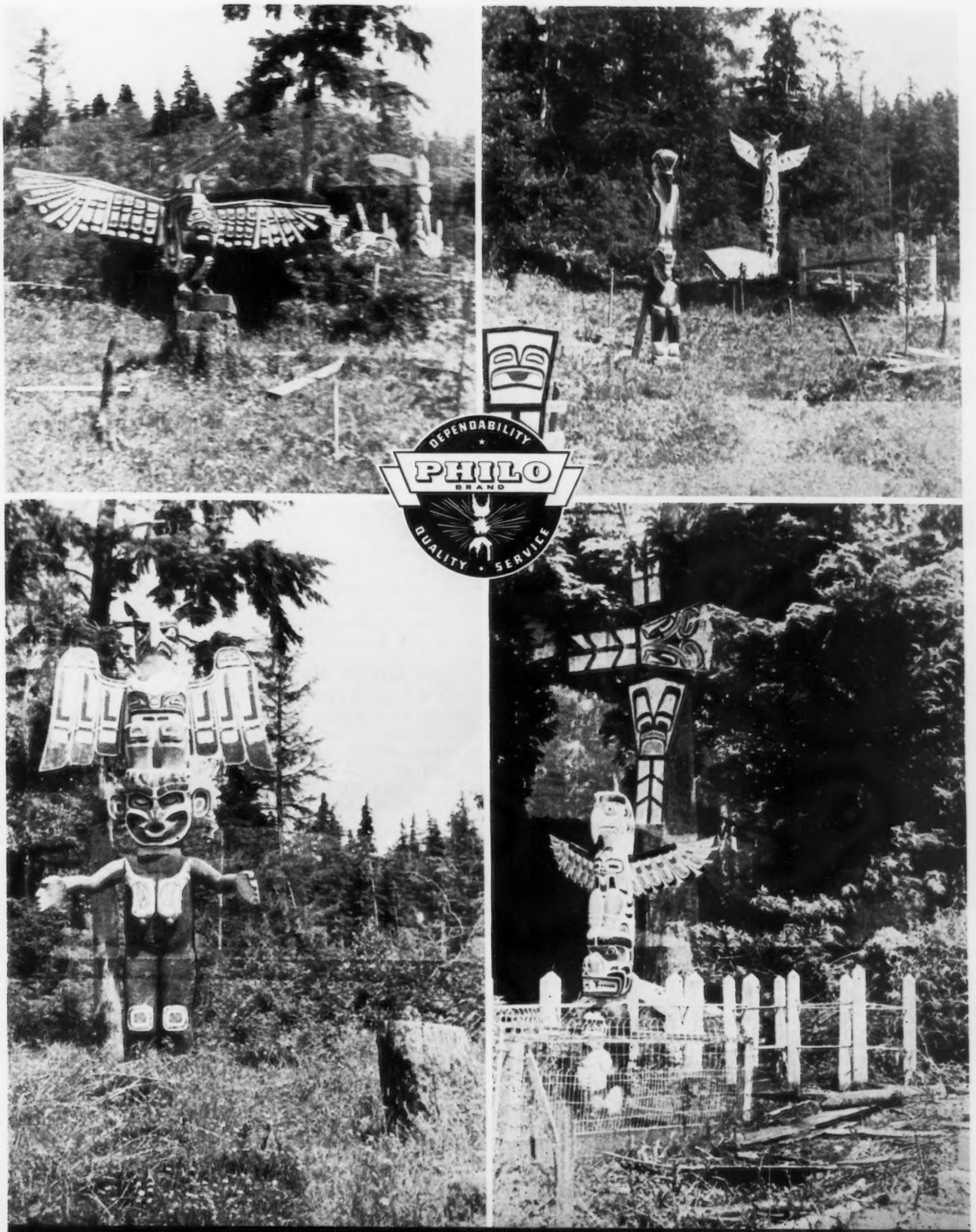
Northrup Aircraft, Inc., which issued its second annual report last week, notes that in September, 1939, when ground was broken for the initial unit of its plant it had no order and only a handful of employees. Today it holds orders totaling $75,000,000. Plant buildings cover an area of 555,000 square feet.

HUGE HOWITZER: This 240 mm. howitzer, shown during recent Army maneuvers in South Carolina, is operated by a crane and drawn in five sections by 10-ton tractors. Top photo shows the loading of a 345-lb. shell by means of crane. Lower photo shows the gun, which can hurl its shell nearly five miles high over a range of more than nine miles.

DOUGLAS AIRCRAFT CO. officially dedicated its new blackout windowless plant at Long Beach Friday, although this huge factory had been in operation for some time. Construction has already started on an expansion program which will double this plant.

Young engineers attending the October meeting of the Los Angeles Chapter of the American Society of Tool Engineers were cautioned by C. R. Rodgers against overlooking difficulties caused by clamping strains, especially in the light metals used in aircraft work, which cause distortions in the finished product.

Rather than stabilizing steel pricing practices on the Pacific Coast, OPA regulations appear, to some extent, to have caused greater diversification. In making deliveries from a mill located on one part of the Pacific Coast to a customer located in another section, it has become common, as allowed by the OPA regulations, to charge freight from the basing point nearest the mill. Application of this practice apparently is not uniform as between companies and sales districts, however. Curiously enough, although freight may be passed on to customers in the above instance, mills located outside of basing points are still forced to absorb freight when making deliveries to customers located at basing points nearest the mill. This unique situation grows out of the fact that Pacific Coast basing points are seaports at which water shipments from Eastern mills were customarily unloaded, and location of some local mills at these points is only coincidence.



Ohio Ferro-Alloys Corporation
Canton, Ohio

Fatigue Cracks

BY A. H. DIX

Battleship Blues

• • • We hear that the battleship Alabama, now under construction in the Norfolk Navy Yard, is being built to the tune of music "sweet and swing, classic and corny," played over an amplifying system during working hours.

To our mind the innovation is dangerous, for different kinds of work need different rhythms. You can't make a sound weld while listening to *"Beat Me, Daddy, Eight to the Bar."* The jerky syncopation interferes with the laying of a good down-hand bead. Welders need something with schmalz like *"Sweet and Low,"* but that would slow down the riveters, who would do their best work to the allegro rat-a-tat-tat of the overture to *William Tell.*

The forge shop might do all right under the majestic measures of the *Anvil Chorus,* but the compulsion to time his hammer strokes to the slow tempo of the same song would cause a carpenter to take five minutes to drive a nail.

Obviously what are needed are headsets so that each man could get the type of music adapted to the kind of work he does. The cranemen could get *"Carry Me Back to Old Norfolk, Virginia,"* alternated with *"Swing Low, Sweet Chariot,"* while the painters would fare best under the strains of *"Flow Gently Sweet Afton"* and *"My Little Battleship Gray Home in the West."*

But it would be far better to call the whole thing off, for after listening evening after evening to the radio next door a man is entitled to some rest during working hours.

Majestic Monicker

• • • Next to the War Department Bureau of Public Relations' Mrs. Oveta Culp Hobby, the person next on our list of names to be envied is Britain's ambassador to Turkey, Sir Hughe Knatchbull-Hugessen. A man with a name like that is destined for a diplomatic career as surely as a boy named Gus will gravitate toward the delicatessen business.

For all we know, Knatchbull-Hugessen may be a small, nervous man, but we picture him as a heavy, impassive individual, a sort of triple cross between Sitting Bull, the Sphinx and the elder J. P. Morgan. He may be a perfect chatterbox but we like to think of him sitting in on a mighty battle of wills, saying nothing but looking Gibraltarish. His attaché says, *"It is the carefully considered opinion of Sir Hughe Knatchbull-Hugessen that . . . ,"* and opposition collapses.

Day's Work for 25c

• • • As we told you before, the alphabetical list of tool steels that ran here serially under the title "1500 Tool Steels," has been reprinted in the form of a 68-page booklet entitled "Tool Steel Directory," price 25c.

We would not bring it up again were it not for the fact that a New York exporter sent us an order for one copy to be shipped to Hongkong, China. The order stated that we were to provide 12 copies of the invoice, 12 copies of the packing list, a clean signed dock receipt from the steamship copy, and three signed copies of the original order. But we fooled 'em; we sent the book free, thereby saving in the neighborhood of $7. It is pleasant not to be in the export business.

Delivery at $1 Per Oz.

• • • *Another enforced excursion into the export business was a check from a Manila, P. I., merchant, for as many copies of Form PD-73 as* $25 *would buy, delivered by air mail. We found it would buy very little, the air mail rate to the Philippines being, we were shocked to learn,* $1 *an ounce.*

This may contain the solution to something that has been puzzling us. They must be shipping pork to Atlantic seaboard markets by air mail these days.

Busy Bodies

• • • Febrile is the word for the state of activity existing in your favorite family journal's brains department these days. There was a time when it was fairly restful—a place to borrow a cigarette, yawn a few times and take a few stitches in the ravelled sleeve of care. But now the atmosphere is as soothing as that of a newspaper city room the night the mayor shot himself ten minutes before press time.

So eager are your reporters to guard you against the loss of a single significant detail of today's fast-changing picture that they are in a state of continual effervescence day after day from nine to five or later. And to make matters worse, the general public is bothering us now more than ever with such questions as:

"What is the specific gravity of sheet steel used in automobiles?"
"What is the Paris gage for nails?"
"What should I get for 1000 lb. of iron junk in my cellar?"
"My little boy has to write a composition on iron. Please send me complete information on it."

But, despite it all, the brains department has found time to prepare for you the brand new, streamlined, eight-page priorities guide that you will find in this issue, and of which you can get extra copies for 25c. each. You might send stamps or coins, out of kindness to our bookkeeping department.

She Sits on Air

• • • Up to now our favorite automobile press agent has been Pontiac's. We have admired his ingenuity and energy, and upon more than one occasion we have immortalized his works. But a release like this, even though we know how hard it is to get out something good on a dull Monday morning, chills our love:

There's no doubt about it—Jimmie Currie is going to be a real chip off the old block. Jimmie is the five-year-old son of C. C. Currie, Pontiac's San Francisco zone manager, and he went to kindergarten for the first time last week. "I hope," he solemnly told his teacher, "that you have some sort of a motor here for me to work on. If you haven't, I won't come to school!"

Children are all right in their place but they should not be allowed to usurp the prerogatives of the conventional automotive press release prop, which is a pretty girl sitting on a fender, or better still on the hood, as in this picture of the new Nash. We like this one particularly because the young lady seems to be resting several inches above the hood and is apparently supporting h e r s e l f by her fingertips and heels, with no visible evidence of strain. The feat is a difficult one and we would like to know how it is done.

Puzzles

• • • Last week's bookworm journeyed ¼ in., or the thickness of two covers.

The Oct. 9 submarine problem was just a trifle to Robert T. Griffiths, E. L. Kahn, and Lt.-Com. A. R. Simpson, who arrived at 110° 44'.

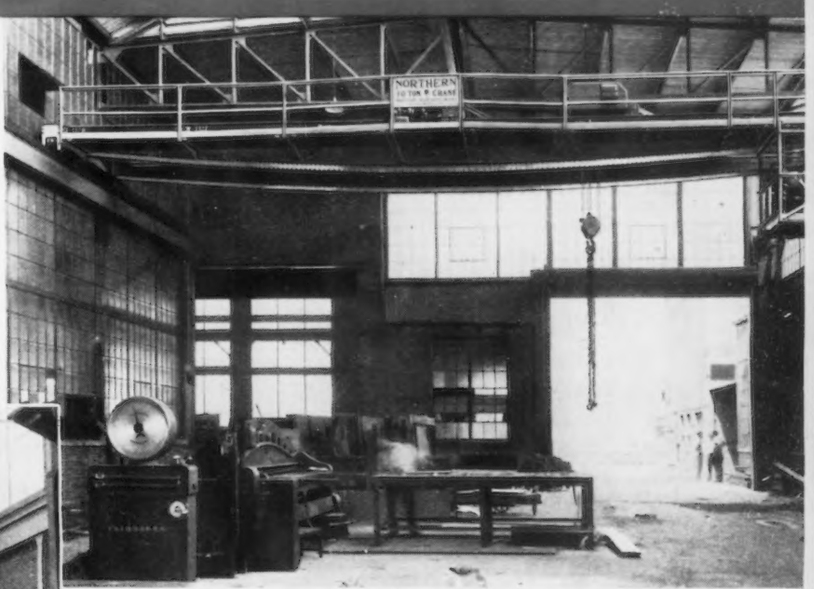
No paper and pencil for this one. An answer in ten seconds puts you on the dean's list:
A man sees the weight of a pile driver strike a pile every five seconds. If he is 220 feet from the pile driver, and if sound travels at the rate of 1100 feet per second, what interval elapses between two successive sounds as the man hears them?

Northern Cranes handle all material in the storage yard of this steel mill.

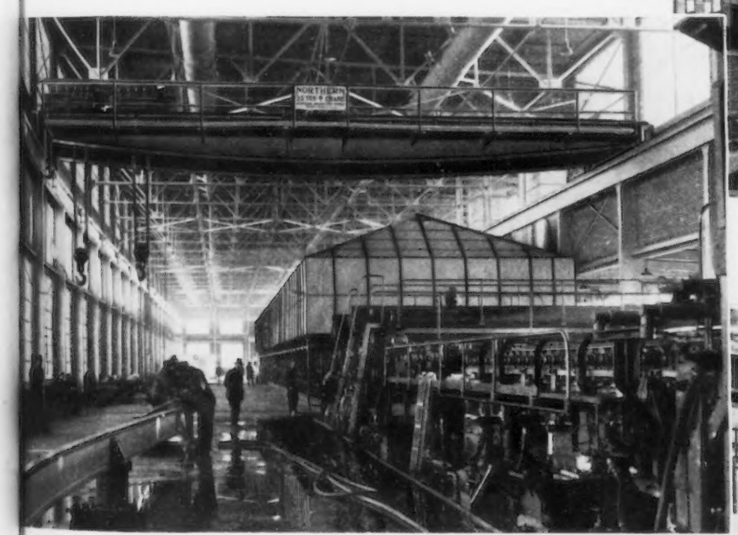
Northern SUPER-CRANES SERVE A WIDE RANGE OF INDUSTRIES

Speed, fine control, excess capacity, exceptional durability, make these Northern Super-Cranes particularly valuable where service is heavy and continuous.

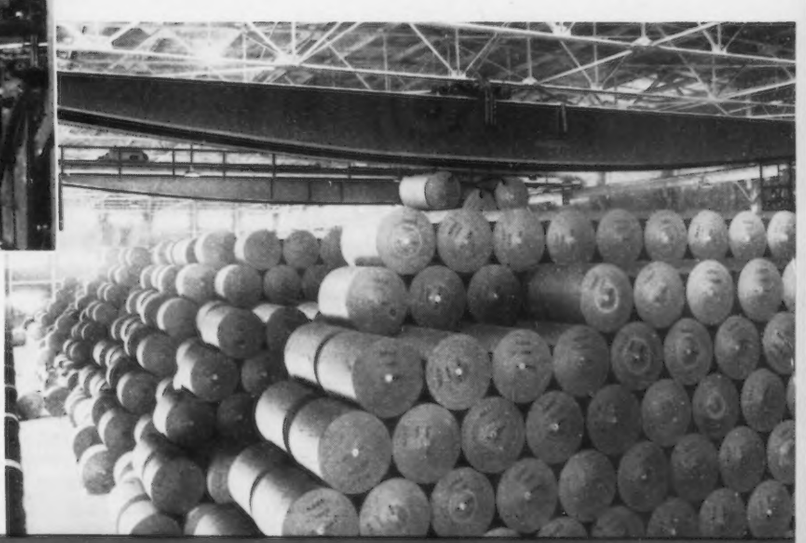
Northern quality assures continuous operation.



Handling plate storage in the warehouse of one of the largest steel fabricators.



A machine room crane in one of the large southern paper mills.



Northern Cranes handle all paper stored in this warehouse.

NORTHERN ENGINEERING WORKS

2607 Atwater Street — Detroit, Michigan

This Industrial Week . . .

o o o

THE U. S. Navy Department, one of the last strongholds of those believing that a large inventory of materials like steel is necessary for production of such defense items as warships, has finally come under the "no-hoarding" ban of the Office of Production Management, THE IRON AGE has learned.

To hasten the proper distribution of vital materials, the OPM has imposed a 60-day inventory regulation on all Navy Yards and shops, so that supplies of steel plates and other critical items cannot be hoarded for use many months ahead while privately-owned plants, defense and non-defense are short of supplies.

Other steps being taken to bring out and redistribute stocked defense materials are likely to show that the Navy is not alone in indulging in a wholly (up to to now) natural desire to foresee shortages and take the necessary steps to assure continuance of production, whether defense or non-defense. Banks, insurance companies, loan companies and other similar agencies are being used to track down stores of supplies which, government defense agencies declare, are now vital to the nation's security.

The Navy Is Not Alone

This week it seemed clear that industry in the United States is entering a period of forced compliance with priorities and of increased allocation of materials where the spread between supply and demand is too wide to permit the effective use of priority ratings. To force compliance with the priority system, a few companies in each division of the metal industries are likely to be singled out by the government for criticism and for tremendous publicity intended to keep possible violators in line. This week, in alleging a violation of general preference orders M-1, M-1-a and M-1-c, Donald M. Nelson, OPM priorities director, suspended aluminum sales, purchasing and shipments of a Chicago company which is said by OPM to have "misrepresented its scheduled shipments of aluminum for the month of July."

Allocations Vs. Priorities

One of the most drastic steps taken by any government agency in the defense program so far—a step which will curtail production in hundreds of civilian product plants—is the OPM priorities division order restricting non-defense industry's use of copper by 40 per cent until the end of this year, and completely prohibiting its use for such purposes after Jan. 1, 1942. The order bans the use of copper in building construction after Nov. 1, 1941. Seven exceptions from the prohibited list in this far-reaching order include government defense contracts where use of copper is specified, products covered by underwriter or other safety regulations, copper used as a conductor of electricity, chemical plants where corrosive action makes other materials impractical, and certain uses in research laboratories, steam generating plants and oil refineries.

Copper Order A Drastic Step

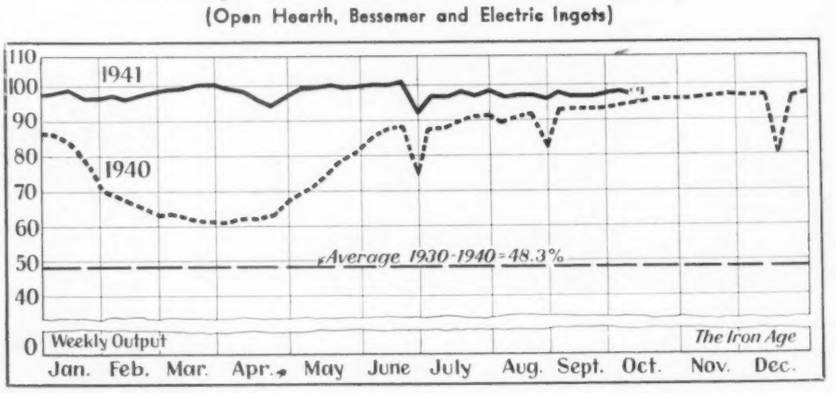
Reasons for the copper restriction order grimly stand out in the latest supply-demand figures which show October copper production of 138,700 tons, against government defense demand for the month of 144,430 tons and total demand, including civilian, of 259,700 tons. The OPM estimates copper production for 1942 at 1,650,000 tons against a demand for all purposes of 2,400,000 tons.

How priorities on copper, steel, aluminum and other metals are affecting U. S. industry, particularly that great section which manufactures only non-defense products and so faces the danger of priority shutdowns, is graphically shown in a priority poll now being conducted by THE IRON AGE. Of the first 500 metal product companies answering priority questionnaires, 136 companies, or more than one in four, report that operations have already been curtailed due to their inability to get material or equipment. One hundred and seventy of the 500 declare that they are short of steel and in many cases have been forced to reduce operations because of lack of this vital metal. Thirty-four of the 500 companies answering the questionnaire said they found themselves short of machine tools, the the shortage resulting in some cases in a decline in operations. Later totals in THE IRON AGE priorities poll are expected to produce graphic evidence of the upheaval which the defense program is causing in U. S.

170 Plants Lack Steel

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts-burgh	Chi-cago	Val-leys	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	De-troit	South-ern	S.Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	99.0	102.0	98.0	90.5	102.0	94.5	94.0	39.0	99.0	103.0	97.0	99.0	108.0	96.5
Previous Week	98.0	101.0	98.0	90.5	104.0	106.0	93.0	74.0*	99.0	96.0	96.0	99.0	110.0	97.5*

* Revised

industry. It likewise may shed light on whether the sufferings of non-defense plants are due in all cases to (1) real shortages of materials, or (2) inefficient and irrational distribution of material under the present priorities system.

Meanwhile the steel industry is continuing its week-after-week schedule of near-capacity operations, with ingot production this week estimated by THE IRON AGE at 96.5 per cent, a one-point decline from last week's revised rate of 97.5 per cent. This week, as last, strikes figured in ingot production and the Great Lakes Steel Corp. strike at Detroit slashed the operating rate there to 39 per cent from 74 per cent a week ago. Before this strike, the Detroit steel rate was the highest in the nation at 107.5 per cent.

Ingot Output Drops a Point

In the Great Lakes Steel shutdown as in several other "vital-plant" strikes in the last year, the picture is clouded, beyond the fact that local strike leaders (or so it seems) are again out of control of the national SWOC leaders. Fifty per cent of the plant's September shipments were for defense purposes and half the orders being held up are for defense. Since the strike's beginning, the OPM has been urging the mill to greater speed in supplying material for trucks for Russia. Great Lakes Steel has orders from most of the Army arsenals and has received pleas from several of the arsenals for shipment of material that should have been rolled early this week. The plant is preparing for the production of ship plate, one of the tightest of defense items, and its major contribution to defense at the present time is material for gun carriages, tanks, aircraft, light-gage oil containers and military trucks.

Arsenals Plead For Material

The Great Lakes Steel strike may be classified as a "mystery" strike, although the possibility that it is one of a series of "feeler" strikes intended to see how much the public will stand in the way of a knock-down fight in steel over the closed shop and dues checkoff can hardly be ignored. At midweek James F. Dewey, Federal labor dispute conciliator, had found a way to describe the Great Lakes shutdown. Said he: "If this were the first time, I would hope that this group of strikers had been misled. Or the second time. Or the third time. But this is the fourth time and I have to look for a more sinister purpose. This is sabotage."

International News Photo

MAGNESIUM BLAST: A building of the National Magnesium Co., Newark, N. J., was wrecked in a blast Oct. 16, killing two persons and injuring seven others. The plant was making magnesium powder for Army and Navy defense orders.

In other steel-producing areas, the shortage of scrap was added to strikes as a factor in mill schedules. Lack of scrap has forced curtailment of operations at Bethlehem Steel Co.'s Lackawanna plant at Buffalo and lowered the ingot production rate for that area to 94.5 per cent from 106 per cent last week. Lukens Steel Co., Coatesville, Pa., was forced to lay off an open-hearth furnace this week because of lack of scrap, but a slight gain at another plant left the ingot rate for the Eastern Pennsylvania district unchanged. An allocation of scrap to a mill in Southern Ohio permitted an increase in steel production there. Slight operating gains are reported at Pittsburgh and Chicago.

At Washington the OPM early this week was struggling to draw up a master form for consolidating the many reports which will be received under the new mandatory priority setup announced Oct. 9 for iron and steel scrap. This priority order appears to be one of the most difficult to administer of any so far issued in the defense effort. At the same time it will not increase the available supply of scrap or correct the now common practice of overgrading. If the scrap shortage becomes as severe as expected, scrap eventually may be allocated on the basis of the percentage of national defense business which a consumer holds.

Scrap Hard To Administer

The steel industry this week continued to book more tonnage than is being produced or shipped, although the influx of new orders is still below the record-breaking volume of August.

Fabricated structural steel awards rose to 25,500 tons from 23,900 tons last week, the outstanding lettings being 5000 tons for a Navy air base at Weymouth, Mass.; 3700 tons for an extension to the Bell Aircraft plant at Niagara Falls, N. Y.; 3600 tons for the Aluminum Co. of America at Bauxite, Ark., and 3500 tons for Bonneville-Vancouver transmission towers. New structural steel projects of 32,500 tons compare with 12,800 tons a week ago.

Reinforcing steel awards of 13,250 tons include 3500 tons at Oklahoma City, Okla., for the Midwest Air Depot, 2200 tons for a Federal Office building in Maryland and 1400 tons for a Navy drydock.

"SHIFT TO DBL HIGH SPEED STEEL ..without losing a second or a cent!"

★ There's a very good reason why OPM restrictions on high-tungsten tool steels needn't bother you a particle. It's DBL High Speed Steel—an exclusive low-tungsten development of our research which was perfected several years ago, especially with the strategic replacement of "18-4-1" in mind.

DBL is *one* tungsten "moly-type" High Speed Steel that slips into the place of 18-4-1 without a single hitch. You have nothing new to buy or to learn, because it heat-treats in the same equipment and by the same methods as 18-4-1. And you won't fall back a step in the production pace, because DBL performs as well as 18-4-1 in 85-90% of all cases, and frequently better!

Our Mill Service Staff is at your service in changing over to DBL or other A-L "moly-type" steels.

Mail the coupon below for the DBL "Blue Sheet," which contains complete technical data.

ALLEGHENY LUDLUM
STEEL CORPORATION
Tool Steel Division — PITTSBURGH, PA. — *Watervliet, N.Y.*

T-24

Allegheny Ludlum Steel Corporation
Oliver Building, Pittsburgh, Penna.

Send me a copy of the "DBL Blue Sheet."

NAME_____

COMPANY_____

ADDRESS_____

News of Industry . . .

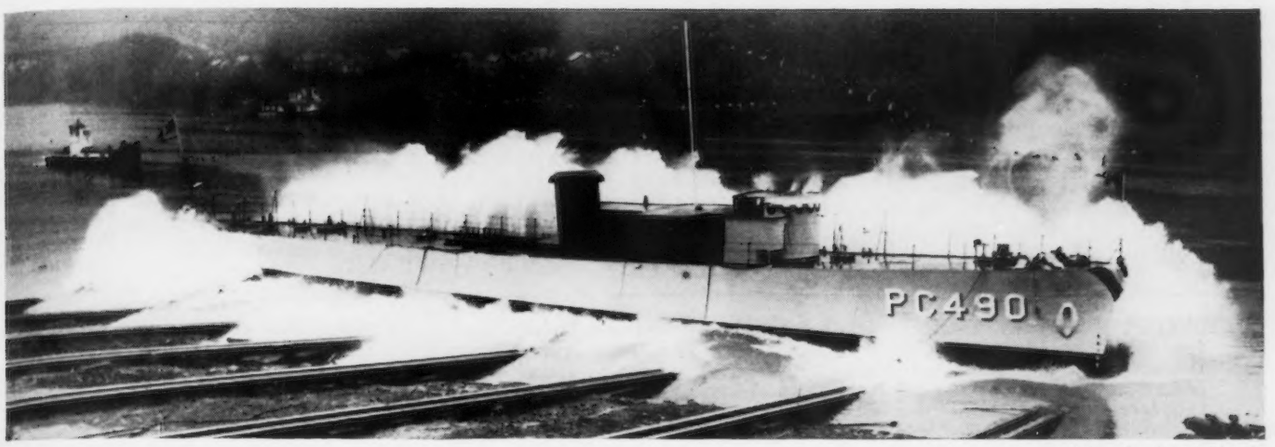


Photo by International

PITTSBURGH WARSHIP: This is the first of 15 submarine chasers to be launched at the Neville Island yards of the Dravo Corp., Pittsburgh. The vessel will travel under its own power down the Ohio and Mississippi rivers to join the U. S. Navy on the high seas.

Priorities Cut Output For 27% Of Metal Plants, First Returns In Iron Age Poll Show

By JAMES A. ROWAN
News and Markets Editor

o o o

• • • **One out of every four** metal plants in the United States has already been forced to reduce production because of government priorities, a Priorities Poll now being taken by THE IRON AGE indicates.

First returns in the survey—which is intended to reveal effects of the priority system on defense and non-defense plants in the metal products industry—show that of the first 500 companies reporting, 136, or 27.2 per cent, have sustained "priority losses" in output.

Three hundred and twelve of the first 500 companies participating in THE IRON AGE poll declare that they have not been forced to reduce production but are, in many cases, operating at 100 per cent of capacity to meet the overwhelming demands of the national defense program. The remaining 52 companies reporting in many cases noted shortages of materials but did not indicate loss of production because of priorities.

While later returns in the survey—reaching THE IRON AGE in flood tide at midweek—may change some of the conclusions which might be drawn from an analysis of the first 500 to report, it is indicated that a far greater percentage of the capacity of metalworking plants in the U. S. is engaged in defense production than is generally believed. Many scores of plants declare that they are operating at 100 per cent on defense.

Shortages of steel, the most vital of all materials to defense, were reported by 170 of the first 500 companies answering THE IRON AGE priorities questionnaire. While many of the 170 said they are short of that metal, not all of that group, which includes defense and non-defense plants, declared that this shortage, so far, has resulted in any reduction in the operations of their plants.

Of the 170 companies declaring themselves short of steel in the first questionnaires to be studied, 24 companies reported inability to obtain all the sheets they require while 21 others said they are short of bars and shafting and 16 are suffering from a scarcity of pig iron. Of the 170 companies, 11 declared they are short of plates and 11 others of castings and cast iron.

Steel shortage reported by other companies of the 170 were: stainless, 10; forgings and forging steel, 12; small shapes, 9; tool steel, 6; alloy steel, 6; carbon steel, 6; strip, 6; wire and springs, 6; structural shapes, 5; galvanized sheets, 5; pipe and tubing, 4; cold rolled steel, 3; tin plate, 2; chrome sheets, 1, and vanadium steel, 1. Six of the 170 companies reported a shortage of iron and steel scrap.

THE IRON AGE poll—results of which will appear in editions of this publication over the next few weeks and which, because of its significance to defense, will be made available to other publications—in-

dicates that 107 of the 500 companies reporting first are short of other metals. As in the case of steel, not all of the companies reporting shortages have been forced, up to this week, to restrict production.

Thirty of the 107 plants reporting non-ferrous metal scarcity in their own businesses said they are short of brass while 20 are suffering from lack of aluminum, 14 from copper; 13, bronze; 9, zinc; 6, nickel; 3, cadmium,; 3 chromium; 2, nickel-silver, and 1, monel metal.

Shortages of many other materials vital to the defense program and to the equally vital, if overlooked, continuance of production in non-defense plants, were reported by 75 of the 500 companies. The names of the companies, which are being held confidential by THE IRON AGE, indicate that some companies appear in various categories of shortages.

Six of the 75 companies in this third classification of companies said they themselves are short of "repair parts," while six others lack electric motors and switches, five need ball and roller bearings and four lack bolts and machine screws. Three companies lack paints, enamels, lacquers; 5, chemicals; 2, welding rods; 2, rivets; 3, small tools and cutters.

Other companies (one each) report themselves short of tractor and auto parts, glue, corrugated cartons, grinding stones, cable, cyanide steel pots, paper and paper board, metal plating supplies, wire cloth, lumber, cork, plastics, molded bakelite, hardware supplies, nails and gages.

Shortages of machine tools were reported by 34 of the 500 companies first to answer THE IRON AGE Priorities Poll, a figure which probably would have been much higher earlier in the defense program when emphasis on the machine tool shortage was greater and when machine tool output was far lower than now. Two companies report a shortage of milling machines; 2, punch presses; 2, screw machines; 3, grinders, and one each, turret lathes, stamping machines, cutting tools, other lathes. Twelve of the 34 said they were short of one of a list of items which includes small tools, taps, dies, drills and files. Three lacked end mills.

Twenty-five other companies reported themselves lacking one or more of the following items: dies for casting, die casting molds, fans, heaters, reamers, valves and compressors.

Skilled labor is reported as a shortage contributing, in some cases, to a "priorities shutdown" or curtailment. Five companies could work at a higher rate if they had the necessary molders, four are short of automatic screw machine operators; 3, die and pattern makers; 6, machinists, 2, sheet metal mechanics; 3, tool makers and lathe operators. Other companies (one each) are short of punch press operators, coremakers, gage grinders, precision grinders, screw machine set-up men, iron workers and general mechanics.

Comments from a few of the companies answering THE IRON AGE Priorities Poll during the last few days follows:

RADIATOR MANUFACTURER, Ohio: "We will have to curtail operations within the next four weeks unless we are able to secure a better flow of cast iron scrap and pig iron. Up to the present we have been able to get along on current receipts and in-

PRIORITIES UNEMPLOYMENT: Another form born of the priorities system is this social security board form ES-223. The board is surveying the extent of unemployment due to priorities or government limitation orders and is obtaining the information on the metal working industry on this form. The report is filled out by firms who have laid off 50 or more men or who have reduced weekly working hours of 200 or more men by 10 hours. A special form for steel plants is due shortly.

Federal Security Agency
Social Security Board
Form ES-223 (10-41)

REPORT OF LABOR DISPLACEMENT
AS A RESULT OF SHORTAGES OF MATERIALS OR PARTS

1. Name of establishment_____
2. Address of establishment_____
(street) (city) (State)
3. Has a previous report on Form ES-223 been submitted for this establishment?_____
If so, give date of most recent report_____
4. Principal products manufactured:
(a) Non-defense_____
(b) Defense_____
5. Number of employees:
(a) Total employees_____ (b) Employees engaged in defense production_____
6. Shortage materials or parts_____
7. Products affected by shortages of materials or parts_____
8. Schedule of lay-offs resulting from shortages of materials or parts:

Date of lay-off	Number of workers to be laid off	Occupational Group		
		Professional, managerial, and skilled	Semiskilled	Other
I	II	III	IV	V
Already laid off				
Total				

9. Reductions in working hours resulting from shortages of materials or parts:_____
10. Plant conversion possibilities:
(a) Have any equipment surveys been made by Government or private agencies?_____
If so, by whom?_____ When?_____
(b) In the opinion of the management, can the plant facilities be converted to defense production?_____ If so, to what products?_____
(c) Outstanding bids on defense contracts_____
11. Employment opportunities for displaced workers in the area:
(a) Specific needs for such workers in the area:_____
(b) Barriers to absorption of displaced workers:_____

Office_____
(city) (street address) (State)

Date_____ Manager_____

ventory, which is now almost entirely depleted."

WOODWORKING MACHINERY MAKER, Ind.: "Since we can't anticipate our normal requirements but must wait until we have specific priority orders, our normal business will suffer more and more, priority as well as non-priority. Our own foundry needs pig iron to take on priority castings and is running at one-third of capacity over the uncertainty of getting pig iron."

EMBOSSING EQUIPMENT MANUFACTURER, N. J.: "We have sufficient material on hand for another three months' operation. Our production will decline due to steel, aluminum and brass shortages."

AXE AND TOOL PLANT, Maine: "Operation of our plant during July and August was reduced to 50 per cent of normal production but we are now at full production because of war orders."

BUILDING IRON WORK MAKER, Michigan: "We are refusing orders because we can't get material such as steel sheets and shapes. Our production loss to date has been 25 per cent; more next month."

GEAR SPEED REDUCERS, Ohio: "Our operation has not been reduced as we have more priority business coming in than this plant's capacity."

FINISHED PISTONS and commercial grey iron castings, N. J.: "Our operations have not dropped so far, due mainly to defense orders but will be dropping soon."

STEAM POWER PLANT EQUIPMENT, Iowa: "There has been no loss as yet, in production, but in view of present conditions there may be soon."

LAWN MOWER MANUFACTURER, Iowa: "This is our normal slack season. Five per cent of our output is for defense. While we have on hand sufficient material to start next season's production, time alone will tell how much priorities will cut into our volume."

AIR CONDITIONING EQUIPMENT plant, Iowa: "It is 'not yet but soon' for us in regard to shortages of steel, other metals, other equipment, machine tools, and skilled workmen."

AUTOMOBILE TRIMMING PARTS, Michigan: "We will probably be stopped completely in 60 days due to steel and nail shortages."

FARM EQUIPMENT MAKER, Iowa: "As farm equipment manufacturers we have been assigned an A-10 and B-1 classification, although whether this will be of much benefit we do not know. At the present time we have sufficient materials in stock to run us the balance of the year, and whether or nor we can secure materials next year is very much a question."

PRINTING MACHINERY PLANT, Pa.: "We have had no reduction to date due to the fact that we had a backlog of orders for our products at the beginning of 1941 which was large enough to keep the plant at full capacity for 10 to 12 months. We procured our materials before priorities and scarcities made such procurement really difficult."

CONTRACTORS' TOOL MAKER, Mass.: "We have not suffered any shortage. Business has been increased. We may suffer later."

GAS RANGE MANUFACTURER, Pa.: "Our stove plant will practically be out of business unless

PRIORITIES SURVEY (Confidential)

To show the effects of PRIORITIES on defense and non-defense plants in the metal products industry, THE IRON AGE asks you to cooperate by answering the following questions:

1. What percentage of your output is for defense? .....

2. To what extent has operation of your plant been reduced by Priorities?

   Percentage loss .....

   Man hours loss per month .....

3. If your production has declined has the loss been due to

	YES	NO	PARTICULARLY
Shortage of steel?	☐	☐	.....
Shortage of other metals?	☐	☐	.....
Shortage of other materials?	☐	☐	.....
Shortage of machine tools?	☐	☐	.....
Shortage of other equipment?	☐	☐	.....
Shortage of skilled workmen?	☐	☐	.....
Lack of orders?	☐	☐	.....

Name of company .....
(This may be omitted)

(If you wish to withhold the company name, will you be good enough to let us know the nature of your peacetime business, as this will help in interpreting the data.)

Peacetime product..... .....

Thank you for your cooperation in a survey that will help the entire industry.

(Please return this questionnaire in the enclosed envelope to The Iron Age, 100 E. 42nd St., New York City.)

EFFECTS OF PRIORITIES: Here is the questionnaire on which many hundreds of plants in the U. S. are listing for THE IRON AGE the effects of the priority system on their production schedules.

outside defense work can be secured."

TOOLS FOR MINING, MARINE TRADE, Ohio: "Our trouble is that we can get enough material by everlastingly asking for priorities but on some sections we are held up entirely too long, especially on steel for the production of coal and mine tools."

DRILLING AND TAPPING MACHINERY MAKER, Conn.: "We are producing more in spite of the headaches. We have had to employ two additional people 58 hr. a week to care for priorities."

COAL HANDLING MACHINERY PLANT, Ind.: "We could increase our production threefold if we were sure of materials and could get good workmen."

CIRCULAR STAIRWAY MAKER, Ill.: "For the past three months, 90 per cent of our defense work has been as a sub-sub-contractor. We have had no luck getting direct orders or as sub-contractors."

U. S. Bike Makers Lack Steel But British Still Ship

By DON R. JAMES
Associate Editor

• • • **Shutdowns** confront bicycle makers in this country, yet shipments recently have come from Great Britain, which is able to spare not only the steel but to finish the bikes in chrome trim.

The injustice is emphasized further by the fact the British cycles are offered for sale at a very low price. A New York department store (see photo) last week put 100 of the models on sale at $29.98 each. An official of the store stated the shipment arrived in this country in late September, after being ordered earlier this year.

Great Britain apparently is able to keep non-defense manufacturing going and is taking a far-sighted view of its markets, despite the fact it is in a far more precarious position in the war than is the United States, where non-defense production rapidly is being shut off by priorities.

American bicycle makers have been unable to obtain a defense rating for material. The industry, which has been enjoying a revival since 1935 and which employs around 15,000 production workers, cannot swing to defense production very easily without extensive retooling.

Furthermore, bike manufacturers believe their product ought to be fitted into the defense program, if for no other reason than that bikes provide exceptionally cheap transportation.

"Even if Mr. Ickes, in his pleas for gasoline saving, is only partly correct, we have an essential product," one large bike maker told THE IRON AGE on Monday of this week. "A bicycle only uses a small amount of steel. We have eliminated chrome and nickel trim to assist the defense program. We are outraged at the fact the British are sending bikes to this country and using chrome trim, but in a way it demonstrates the foresight of the British in keeping at least a small part of their non-defense production going with a view toward maintaining markets."

The American bike makers planned to meet in Cleveland Tuesday of this week to discuss material shortages, which are becoming more serious.

Inquiry at the British consulate in New York revealed that negotiations are still in progress toward the curtailment of British imports to the United States. It is expected shipments of bicycles to this country will be banned, with many other products using steel. Shipments of bicycle parts will be allowed, however. Some British bike makers already have sent letters out stating that they will be unable to ship complete bikes to the United States.

Just Arrived!
BLOOMINGDALE'S
ANOTHER 100
ENGLISH BICYCLES
Sale 29.98
Chrome-plated handlebars and trim
Rear wheel brake on handle
Our last shipment practically rolled out at our low price! When it comes to bicycles the English know how to make them! These are made of famous English lightweight tubular steel. Free-wheeling; chain guard on women's model; right height for everybody—boys, girls, grownups.
Sporting Goods, 6th Floor
Lexington at 59th
VOlunteer 5-5900
Dunlop ordinary tubes and tires
Front hand brake for safety in wet weather

Short of Steel?

JUST ARRIVED—This ad in a New York newspaper Oct. 14 aroused a lot of comment, particularly from persons who have had difficulty getting steel in this country recently. The bike weighs about 35 lb. and is a touring model made in Darlston, England. The price is very reasonable. According to the department store, the shipment arrived in the United States in late September, against an order placed a long time ago.

Awards Plane Contract

• • • **The War Department** has awarded a contract for airplanes and spare parts to the Republic Aviation Corp., Farmingdale, L. I., totaling $64,404,036.50.

Steel Companies' New Expansions Cover Wide Range

Washington

• • • **As part of a** 1,000,000-ton expansion proposed in the recent report by W. A. Hauck, its Iron and Steel Branch Consultant, OPM has recommended to the Defense Plant Corp. an annual increase of 318,000 tons in the electric alloy and stainless steel ingot capacity of Republic Steel Corp. at Canton, Ohio.

The steel will be used for the manufacture of aircraft forgings and armor plate for tanks. The proposal calls for five 50-ton electric furnaces and necessary supplementary equipment. OPM estimated that the plant can be in operation within five or six months, if the necessary priority ratings are granted.

In his report, Mr. Hauck said that an increase of 1,000,000 tons in electric furnace output is urgently needed, as well as finishing plants to manufacture hardened steels for aircraft, tank armor, shells and machine tools if the defense production program is to continue at high speed. Proposed electric furnace expansion included in the program submitted by steel companies to Mr. Hauck involved 951,760 tons.

Requirements for rolled armor, much of it for tank steel, have risen greatly, it was stated at OPM, since the Hauck report was approved by SPAB. Mr. Hauck said that a program providing for at least 100,000 tons of steel capacity for rolled armor together with balanced facilities was being developed. It is understood that rolled armor requirements now are fixed at about 300,000 tons.

↓ ↓

Bethlehem Will Add Furnaces, Ovens and Mill

Washington

• • • **Three 1200-ton** blast furnaces, coke ovens, one open hearth furnace and a plate mill are to be constructed by Bethlehem Steel Co. under the $55,777,000 financing agreement announced last week by the Defense Plant Corp. It marks the first of the "scrambled facilities" program outlined in the report of W. A. Hauck, OPM Iron and Steel Branch Consultant, in which he recommended a 10,000,000-ton ingot expansion.

One blast furnace each will be built at Bethlehem's Lackawanna, N. Y., Bethlehem, Pa., and Sparrows Point, Md., plants. At Lackawanna and Sparrows Point the necessary additional coke ovens will be built, and new ovens also will be installed at Bethlehem's Steelton Pa., plant, but no new coking facilities will be necessary at Bethlehem. The blast furnaces will have an annual capacity of approximately 1,332,000 tons of pig iron. The new ovens will have a capacity of about 1,194,000 tons of coke.

The open hearth furnace, with an annual ingot capacity of 180,000 tons, and a 132-in. semi-continuous high speed plate mill will be built at the Sparrows Point plant. The mill will have an annual capacity of 780,000 tons and will roll plates up to 120 in. in width. It will be in production in 12 to 14 months. The estimated cost is $20,407,000.

Bethlehem is completing the construction of three company-financed open hearth furnaces at Sparrows Point, with a 552,000-ton capacity.

↓ ↓

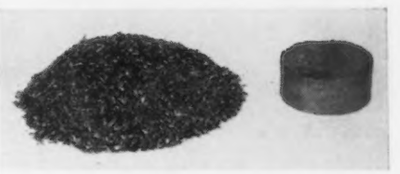
New Rod Mill Included In Columbia's Program

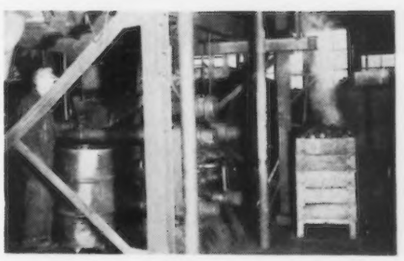
San Francisco

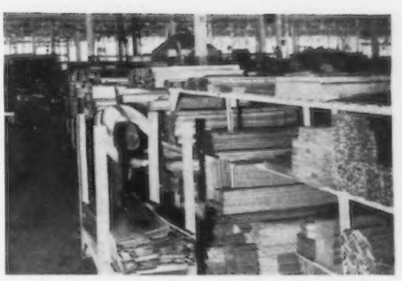
• • • **Columbia Steel Co.,** a subsidiary of the United States Steel Corp., will increase capacity of its Pittsburg, Calif., plant with the addition of a new semi-continuous rod mill, together with billet heating furnaces, rod cooling and handling equipment. The rod mill will be housed in a new building to be built east of the plant's open hearth building.

The plant's wire and nail mill will be improved and extended to include additional wire drawing and nail machines, and new facilities for the manufacture of some wire products. Changes will also be made in the primory rolling mills, allowing production of longer rod billets.

The steel-making capacity of the Pittsburg plant is being increased to the extent of 77,000 net tons of ingots annually by the in-







NOTHING WASTED: These photographs, taken at the Caterpillar Tractor Co. plant, illustrate the care with which U. S. industry is handling "waste" metal. All turnings at Caterpillar Tractor are spot checked (top photo) for nickel analysis, the nickel alloy turnings being handled separately. Approximately 33 tons of briquettes (second from top) are produced daily at the plant, the pile of gray iron borings showing the amount needed for one briquette. Pressing of the briquettes is shown in the third photo from the top. Material obtained by shearing slugs and large crop ends from sheet metal parts are (bottom photo) classified and stored.

stallation of a new open hearth furnace and by an increase in the capacity of the four existing open hearth furnaces.

Pig-Casting Building Will Be Enlarged

Buffalo

• • • **Hanna Furnace Corp.,** pig iron division of National Steel Corp., will spend $200,000 enlarging its pig-casting building and for new machinery to step up production at its plant here. The Hanna plant, with all four blast stacks at capacity since July, 1941, is producing 2000 tons of iron a day, an all-time peak.

Republic Proposes to Buy Wickwire Spencer

• • • **Republic Steel Corp.** has made a tentative proposal to purchase for $7,349,062 in cash all assets of the Wickwire Spencer Steel Co., according to George W. Treat, chairman of Wickwire Spencer, which has plants in Massachusetts and western New York state and produces wire and merchant wire products.

Mr. Treat told stockholders Republic first made an offer last April, which was rejected. The latest offer is subject to "numerous conditions," among them approval of the board of directors of Republic.

Wickwire Spencer emerged from a reorganization under Section 77-B in April, 1937.

Expansions at Armco Are Authorized

• • • **Defense Plant Corp.** has authorized the execution of a lease agreement with American Rolling Mill Co., to provide for facilities to be located at Ashland, Ky., at a cost of approximately $842,000 to be used in the production of synthetic scrap, by bessemer converter. The plant will have an annual capacity of approxiamtely 600,000 tons.

Electric furnace capacity will be installed at Middletown, Ohio, at a cost of approximately $584,000, to be used in the production of steel ingots. The plant will have an estimated annual capacity of approximately 43,200 tons and will consist of three small electric furnaces.

Defense Lighting Brings Expansion

Cleveland

• • • **During an official** inspection of the expanded facilities of the Cleveland lighting division of the Westinghouse Electric & Mfg. Co., the company announced that defense orders were now accounting for more than 75 per cent of the total business, and that the percentage would soon rise to 90 per cent. Defense lighting equipment is now going into many airports, naval bases and armament plants.

The completion of three new buildings will permit an immediate 100 per cent increase in the company's output of lighting equipment urgently needed for defense. Employees at the local plant have about doubled to 1,100. Major new facilities include 40 per cent more manufacturing space, a new power house, 11 relocated or expanded production lines, and over a mile of new conveying systems for better handling of raw materials, parts, and finished products in 20 interconnected buildings.

Many substitutions have had to be made in certain materials such as aluminum, copper, brass, and zinc, since the company's limited inventory of these metals will soon be exhausted. Aluminum reflectors have been replaced by specially painted steel, and a substitute for aluminum paint has been developed.

Defense Plant Corp. Approves More Leases

Washington

• • • **The Defense Plant Corp.,** at the request of the War Department, has authorized the following leases:

General Motors Corp., Fisher Body Division, increase of $340,520, over present commitment of $3,957,029, for additional facilities to be used in production of aircraft equipment at Memphis, Tenn., plant. About $204,745 will be used for equipment and $135,775 for land improvements.

Aviation Mfg. Co., Lycoming Division, Williamsport, Pa., $3,714,277, for production of airplane engines. About $2,757,028 will be used for machinery and equipment and $957,249 for land improvements.

The Symington-Gould Corp., Rochester, N. Y., $1,256,105, for construction and equipping of plant for the production of ordnance equipment. About $757,100 will be used for machinery and equipment and $499,005 for land and buildings.

Houde Engineering Corp., increase of $731,000 over present commitment of $38,865, for acquisition of machinery and equipment for the production of airplane equipment.

General Alloys Co., Boston, $91,163, for construction and equipping of plant at Boston to be used in the production of aircraft equipment. Approximately $44,000 will be used for machinery and equipment and $47,163 for land and buildings.

BIRTHPLACE FOR BATTLESHIP: This new $10,000,000 drydock built by the Navy on the Delaware River near Philadelphia is 1100 ft. long and 150 ft. wide. A warship twice the size of the 35,000-ton North Carolina could be accommodated in this basin.

Danger of Priorities To Small Industry Reviewed For Senate

Washington

• • • **Granted only** a few minutes because "time was limited," President Leighton Wilkie of the Continental Machines, Inc., Minneapolis, was able to review but briefly before two members of the 24-man Senate Committee on Appropriations last Thursday a carefully prepared and striking statement on the serious plight of small business as the result of the priorities system.

To the two senators, Adams of Colorado and McKellar of Tennessee, both Democrats, Mr. Wilkie urged disapproval of the second lend lease appropriation of $6,000,000,000, pointing out that its passage at this time is not necessary. He stated that the appropriation deals not with present needs but with the needs of the indeterminate future and that less than 3 per cent of the first amount appropriated under the Lend-Lease Act has been spent and even less than that has been appropriated.

In his statement, Mr. Wilkie inquired if the time has not come to stop and consider whether the proposed added appropriation "may not be the final straw—may not be the last step which marks the difference between solvency and bankruptcy."

Mr. Wilkie explained that he represented no organization or committee but that he spoke for a large number of business men who represent a cross section of small business in America. He pointed out he had no personal grievance or complaint.

"We are not alarmists," Mr. Wilkie's statement said. "We are looking at this situation rationally. But there is conclusive proof in our minds that the country cannot survive a program which is creating an immediate depression through the system of priorities and, at the same time, laying the foundation for a future insolvency. This condition, I believe, is being brought about by three principal factors:

"(1) By a system of priorities which is driving small companies out of business every day and throwing increased thousands out of employment.

"(2) By a reckless piling up of a national debt—a debt so large as to make repudiation the only solution.

"(3) By a complete misunderstanding of how our industrial life functions, which is resulting in a misconception—or no conception at all—of how we are going to conduct our internal economy when this boom is over."

"I realize," Mr. Wilkie continued, "that the present program of gifts to other countries is being carried on in the name of national defense. National defense is an objective to which every American subscribes. The question I should like to pose for your consideration is this: Are we to carry this phase of national defense to such an extreme that it will destroy here in America the very things we believe we are defending?"

To outline the nature of the American industrial structure, Mr. Wilkie presented a chart which he prepared and was published originally in THE IRON AGE of June 8, 1939, showing an overall picture of the American econ-

PLENTY OF WORK: This Algerian shipyard is busy repairing vessels damaged in naval action. A French battleship damaged at Oran is shown in the yard (top center). Bottom view shows a hole torn in the side of a vessel by a shell.

omy. A copy of this chart, Mr. Wilkie said, hangs on the wall of the office of Alfred P. Sloan, chairman of the board of the General Motors Corp., and in many other offices of business executives. The value of the chart, Mr. Wilkie said, is testified to in a file of letters he has received from business and industrial leaders.

The evolution graphically shown by the chart pictured a change over the past 50 years into a complex industrial society that gears every wage-earner to it and makes him utterly dependent upon its proper functioning.

"The depression following 1929, and the utter dislocation of our entire economy has been recognized as the ultimate result of the destruction of World War I. Similar dislocation will follow from this war—but this time we are not waiting twenty years. It is already proceeding apace with government sanction. The system of priorities has already caused—on a menacing scale—the closing of factories and the loss of jobs, which constitute the first stage in the downward spiral of a full-grown depression."

Mr. Wilkie cited different authorities, government and private, to show how small manufacturers employing hundreds of thousands have been closed down or are threatened with being closed down by the stringency of defense material rationing.

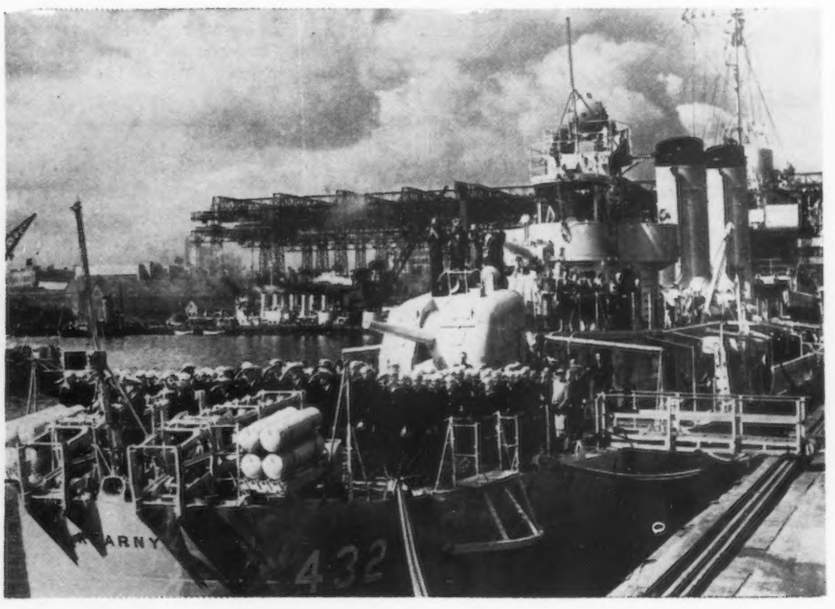
This trend was declared to loom the more dangerous when viewed against the background of a mounting national debt.

"We could repudiate or refuse to pay debts that would bankrupt our insurance companies and banks, whose vaults are stuffed with billions of Government bonds, or we could scrap the American system, scrap private enterprise and scrap individual reward for individual thrift and energy, and become a socialistic nation, a socialized state like Germany and Russia," Mr. Wilkie's statement said.

"We don't want any of those things to happen. Solvency of the American economy is the most important consideration of Congress today. There is no sense in building a national defense for a bankrupt nation.

"It is not encouraging to the American business man to contemplate the abstract thinking and unwillingness to face realities displayed by those who advocate more and more spending on behalf of other countries. Abstract thinking is one of the chief factors which is leading this country into certain doom."

THE TORPEDOED KEARNY: Shown below is the U. S. destroyer, Kearny, which last week was torpedoed in the North Atlantic while on patrol 350 miles southwest of Iceland. This photograph was taken recently at the Brooklyn Navy yard.



Repairs Order Is Broadened by OPM

• • • **A broad change** Oct. 16 in Priorities Order P-22 extends to all manufacturers and business generally, except for retailers, the use of the A-10 priority rating for maintenance, repair and operating supplies.

Without making application for use of the rating, the following are qualified to apply the rating to their own needs, under the amendment to P-22:

Any governmental unit; any manufacturing, processing or fabricating industry; storage or distribution warehouses; wholesalers; charitable institutions; all types of carriers, such as trains, buses, trucks and shipping; educational institutions; printers and publishers; commercial radio broadcasters and communications; telephone and telegraph communication, including newspaper wire services; hospitals and similar institutions, and organizations interested in the discovery and development of petroleum pools.

Use of the rating by those qualified is accomplished by stating on the face of the order: "Material for maintenance, repair or operating supplies—Rating A-10 under Preference Rating Order P-22, as amended, with the terms of which I am familiar." This statement must be signed by a responsible official "duly designated for the purpose."

The rating can also be used to obtain fuel, an operating supply. A separate purchase order must be executed for materials. The rating cannot be used for materials which can be obtained without use of the rating, and the level on 1940 inventory cannot be exceeded by use of the order without special permission.

The order emphasizes the fact that the rating granted cannot be used to obtain anything except maintenance, repair and operating supplies as these are defined in the order.

The phrasing of the certification to be placed on all purchase orders for such materials make it mandatory for those using the order to be familiar with all its terms before using it.

Certain stipulations are in-

cluded in the order to prevent improper use:

1. Purchase orders for repair, maintenance and operating supplies must be made up separately from all other orders, if the rating is used.

2. The rating must not be used if the material can be obtained without a rating.

3. Producers using the rating may do so only to obtain materials in quantities which are not above certain 1940 levels as defined in the order; provided, however, that the Director of Priorities may permit larger quantities of materials to be ordered and used in proportion to any increase in operations over last year's levels.

4. Misuse of the plan may result in direct punitive action.

5. Utilities and mines covered by separate repair orders are not covered by the present order. However, the plan does apply to all other establishments previously covered by Preference Order P-22, which is now revised by the new plan.

OPM Will Get Data on Steel Shortage Shutdowns

Washington

• • • **The OPM Iron and Steel** Branch has worked out and approved in principle a plan to enable the OPM to analyze critical individual cases where the lack of steel threatens an immediate shutdown and a serious curtailment in the operations of any single enterprise. Final approval of the plan by SPAB together with the issuance of a form is expected some time during the present week.

The plan was worked out in cooperation with the Iron and Steel Defense Advisory Committee and a subcommittee on conservation. This plan is designed to obviate the long period that would be required to develop an equitable system for the allocation of residuary steel products for civilian uses in the order of the relative importance of each product to all other products necessary to an economy.

Under the plan, cases will be analyzed from the standpoint of individual reporting concerns, whether the condition will become common to the industry in which the customer is operating, or its effect on labor, on the life of the community in which it is situated, or in other concerns depending upon its production.

It is reasoned that these cases will supply vital data on which future priority positions or allocations of materials may be determined.

PRESENT FOR ENGLAND: When C. W. Heppenstall, president of the Heppenstall Co., Pittsburgh, asked leaders of the air-raided borough of Rotherham, England, what they desired from him, they answered "a modern X-Ray machine." Heppenstall, whose family has been in the steel business in Rotherham for 150 years, has sent the machine to the Rotherham hospital which has been handling 10,000 casualties a year since the war began.

Car Shops Still Below Capacity

Pittsburgh

• • • **Freight car** building activity picked up in September over August but total car production, excluding railroads, own car shops, was still only 36 per cent of rated capacity and 49 per cent of practical capacity. Some sources look for a higher level of production in October but this will depend upon the demands for steel plates by Naval and Maritime interests. Some plants which were shut down most of August were producing cars in September but the majority of plants were still operating at a low level of rated or even practical capacity. Hence, after four months of intensive effort to speed up freight car building, actual production in recent months has not come up to that obtained earlier in the year.

Domestic Freight Car Building Activity

September and August, 1941

(Railroad Car Shops Not Included)

Company	September	August	Monthly Capacity
American Car & Foundry Co. ...	1,611	818	4,775
Pullman Standard Car Mfg. Co. ..	1,117	615	4,000
Pressed Steel Car Co.	517	513	1,350
General American Transportation Corp.	524	664	1,300
Greenville Steel Car Co.	100	100	400
Bethlehem Steel Co.	572	599	800
Virginia Bridge Co.	0	0	300
Ralston Steel Car Co.	137	144	500
Mt. Vernon Car. Co.	270	225	350
Pacific Car & Foundry Co.	240	207	250
Magor Car Co. ..	80	0	300

Domestic Freight Car Production

(Carbuilding Plants Only)

	Cars Produced	Per Cent of Capacity Rated*	Per Cent of Capacity Practical†
January	5,009	36	49
February	4,122	29	40
March	5,022	36	49
April	5,563	40	54
May	5,086	36	49
June	5,143	41	50
July	5,491	39	53
August	3,886	28	38
September ...	5,044	36	49
9 months...	44,366	35	48

*Based on 14,000 cars a month capacity.
†Based on 10,300 cars a month capacity.

Chicago Strikes Have Wide Effect In Defense Plants

Chicago

• • • **Repercussions** of steel losses sustained by Carnegie-Illinois plants here due to labor disturbances have spread to important customers working on vital defense projects. Not only have these defense production schedules been moved back, but even in some cases customers have had to lay off men due to curtailed steel shipments.

With many steel consumers working to almost day-by-day schedules because of tight steel supplies, many firms felt the pinch almost immediately. An even greater number will be slowed down 30 days hence, since the 40,000 tons of ingots, 30,000 tons of rolled products and 25,000 tons of blast furnace pig iron lost by Carnegie will never be recovered in these days of capacity operations.

In a survey conducted by THE IRON AGE among a few representative firms in this district, it was learned that defense has been set back. Pullman-Standard Car Mfg. Co. reported revisions in delivery promises will be felt seriously in the next 30 days. Steel ordered for medium size tanks, trench mortars, shell and freight cars will be delayed so that deliveries on these items may be set back 10 days to two weeks.

Chicago Bridge & Iron stated that the strikes had cost it the loss of a full week's production. The company makes floating drydocks for the Navy, elevated tanks for army cantonments and airfields, penstocks for hydro-electric developments, etc.

American Car & Foundry was hurt so badly by the sheet and tin mill strike losses that the equivalent of another two or three days shutdown of the mill would cause American to close its plant. This builder of important railroad freight cars has suffered about a 10-day delay in production.

Roof decks for the Ford bomber plant will be delivered more than a week late by U. S. Gypsum Co., due to the strike. This firm, too, is working so close to steel delivery schedules that the slightest hitch will move back defense deliveries much more.

The Grip-Nut Co., builders of railroad car supplies, estimates it has lost about two weeks with Carnegie's loss in bar production. Construction of defense plants such as the Elwood (Ill.) ordnance plant and unnamed projects in the Panama Canal Zone will receive shipments several weeks later than expected from Ceco Steel Products Co.

A host of firms interviewed stated that their losses were not immediate but they knew they would be forthcoming within the next 30 to 60 days.

International News Photo

STRIKER SEIZED: Protesting the arrest of three pickets outside the plant of Air Associates, Bendix, N. J., this striker was taken into custody by police after a hail of stones rained down on a car bringing workers to the building.

LAUGHING AT PICKETS: After evading 50 CIO pickets at the gates of the Carnegie-Illinois tin mill in Gary, these independent girl workers climbed gingerly over the sharp picket points of an 8-ft. fence to enter the big plant.

Steel Output Threatened By End of Coal Mine Truce

Washington

• • • **Steel production** schedules were threatened on another front on Tuesday when John L. Lewis, president of the CIO's United Mine Workers Union served notice that the "truce" in steel-owned captive coal mines would expire midnight Saturday. Lewis' announcement was contained in a letter to the National Mediation Board.

Hopes of Producing Even January Auto Quota Look Bleak

Washington

• • • **OPM officials warned** against interpreting their latest curtailment order, reducing passenger car production in January, 1942, at least 51 per cent below last January's output, to mean that, because lower allotments are established for January, materials will necessarily be available. Manufacturers can produce up to the maximum only if they are successful in obtaining materials, Leon Henderson, director of OPM's division of civilian supply, said.

The OPM curtailment order, announced by Mr. Henderson, limits manufacturers to a maximum output of 204,848 passenger cars in January, which, taken with the 26.5 per cent cut ordered for the four-month period ending Nov. 31, and the 48.4 per cent December reduction, will result in at least a 36.3 per cent curtailment for the first six months of the model year that began Aug. 1. Production for this period, OPM said, can be 1,228,065 cars, depending upon availability of scarce materials, compared to 1,928,517 during the corresponding period last year.

Under OPM's January program General Motors, Chrysler and Ford production will be cut an average of 55.1 per cent, and Studebaker, Hudson, Nash, Packard, Willys-Overland, and Crosley will be permitted an 8 per cent increase above the January, 1941, output. Of the latter group, only Nash and Willys-Overland were directed to curtail production below last January's. Increases allowed the smaller companies were attributed to seasonal fluctuations; for example, Studebaker and Packard produced approximately 3000 fewer cars each in January, 1941, than in December, 1940.

Last Thursday, the day following issuance of the curtailment order, Joseph W. Frazer, president of Willys-Overland Motors, outlined to government representatives a plan for automobile allotment which he claimed would release more than 200,000 tons of raw materials for defense needs and at the same time supply civilian needs. Designed to replace the present OPM allotment method, the plan proposes production of only the lightest weight car.

The plan also would allocate production on the basis of critical material used, volume needed for successful operation, the number of dealers dependent on a manufacturer, elimination of deluxe models and the production of only two-door and four-door sedans. Mr. Frazer told a press conference that his proposal would save 158,728 tons of steel, 36,383 tons of iron, 13,188 tons of rubber and 19,101 tons of other materials such as lead, copper and zinc.

FIGHTS BOMBER SEIZURE: The commandeering by the U. S. of 18 Douglas light bombers bound for Peru was protested vigorously by Col. Armando Reveredo, air attache of the Peruvian embassy, who viewed the act as unfriendly to his country.

Superior Ore Use Continues at Record

Cleveland

• • • **Iron ore consumption** during September continued at record levels, with the total for that month slightly lowered by the fact that it was a 30-day period. The Lake Superior Iron Ore Association reported that furnaces in the United States and Canada consumed a total of 6,447,539 gross tons, only one per cent below the 6,534,424 gross tons for August. This brought the total for the first nine months of 1941 to 56,160,488 gross tons, compared with 43,239,859 gross tons for the same period of 1940.

Gross tons of iron ore on hand at U. S. furnaces amounted to 34,841,774 on Oct. 1, while 4,663,629 gross tons were lying on Lake Erie docks on the United States side. The number of furnaces in blast in the United States rose to 172 on Oct. 1, from 170 a month earlier and 153 a year ago. Canadian furnaces in blast rose to seven with the operation of the new Hamilton, Ontario, unit of the Steel Co. of Canada.

The number of American ships in the Lake ore trade on Oct. 15 continued at 292, with a trip capacity of 2,688,040 gross tons. In addition, 17 Canadian boats have been loading American ore for American ports during this shipping season.

Warner & Swasey Quarter Profits Are $1,181,482

• • • **Warner & Swasey Co.,** Cleveland, reports net earnings for the third quarter of 1941, after all deductions, of $1,181,482, as compared with net earnings of $1,263,356 for the second quarter of 1941 and $668,855 for the third quarter of 1940.

Keystone Quarterly Profit 27% Above 1941 Period's

Peoria, Ill.

• • • **For the three months** ended Sept. 30, 1941, Keystone Steel & Wire Co. reports net profit of $352,414 after all charges including taxes. This compares with net profit of $280,409 for the same quarter of last year.

Moses Wins First Kimbrough Medal

White Sulphur Springs, W. Va.

• • • **The Hon. Robert Moses,** Commissioner of Parks for New York City and Chairman of the New York State Council of Parks, was presented with the J. Lloyd Kimbrough Gold Medal Award by the American Institute of Steel Construction for being the "dy-

namic force behind the expansion of New York's park systems, the parkways in which involved the construction of many bridges." Mr. Moses achieves the distinction of being the first ever to receive the Kimbrough award, which was made at the annual convention of the Institute at White Sulphur Springs, on Oct. 16.

The J. Lloyd Kimbrough Medal was conceived in memory of the first president of the American Institute of Steel Construction to honor Mr. Kimbrough for his outstanding contributions to the structural steel fabricating industry. Unanimously elected as the Institute's first president, Mr. Kimbrough served for seven years, promoting the use of structural steel. The gold medal award is reserved for special distinction to those who, through their engineering and public service efforts, promote the usefulness of structural steel, and will not necessarily be made periodically.

Fire Destroys Foundry With $1,000,000 Worth of Orders

Philadelphia

• • • **OPM officials** at Philadelphia state that full support and all necessary priorities would be given the Penn Steel Casting Co., to get back into operation their No. 1 foundry, which was destroyed by fire on Oct. 9. More than $1,000,000 worth of defense orders are being held up until the unit gets into production.

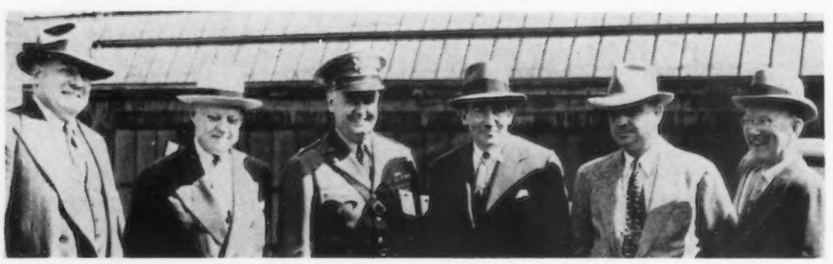
The fire was caused by equipment failure when a steel cable snapped, striking an oil feed line, causing oil to spray over a 25-ton ladle of molten steel. The damage, estimated at $500,000, was confined to the one foundry, but machinery, castings, and patterns were destroyed.

Buffalo Apartment Job Jeopardized by Ban

Buffalo

• • • **The new restrictive** orders on non-defense construction probably will delay building of Fairhaven Village, local waterfront apartment housing development planned at a cost of $11,000,000, it is feared here. Officials are seeking to have the SPAB's ban set aside in this case.

TOLEDO DEFENSE PLANT: Army officers who inspected defense plants at Toledo, Ohio, saw 155 mm. shells, "jeep" reconnaissance cars, machine gun parts and other defense items being made at the Willys-Overland Motors plant. Brig. Gen. Burton O. Lewis, who headed the group, is shown with, left to right, Joseph W. Frazer, Willys-Overland president; C. O. Miniger, chairman; and R. G. Martin, president Electric Auto Lite; Vern R. Drum, Willys vice-president in charge of manufacturing, and Ward M. Canaday, Willys chairman.



Studebaker Gets Order For More Plane Engines

Washington

• • • **Totaling** $74,338,783, the War Department has placed orders for additional Wright aeronautical-type engines with the Studebaker Corp., South Bend, Ind. The engines will be manufactured in plants constructed under Emergency Plant Facility contracts previously awarded by the War Department and will be manufactured under license of the Wright Aeronautical Corp.

Contracts Awarded for East Tennessee Ordnance Works

Washington

• • • **The War Department** has awarded the basic contract covering the East Tennessee Ordnance Works at Copperhill, Tenn., to the Tennessee Copper Co., New York. A subsidiary contract has been awarded to the Leonard Construction Co., Chicago. It is estimated that the plant, which will manufacture oleum, will cost $3,340,844, of which $1,302,000 will be for equipment and machinery.

American Chemical Paint Moves Plant to Ambler

• • • **American Chemical Paint** Co., Ambler, Pa., has completed a new alkali plant in Ambler, and after Oct. 25 will transfer to this plant the manufacture of alkalis and cleaning compounds formerly carried on at its Tidewater Division, Newcastle, Del. This will centralize all activities of the company at Ambler.

190 Dropped At Tank Plant Due to Lack of Steel

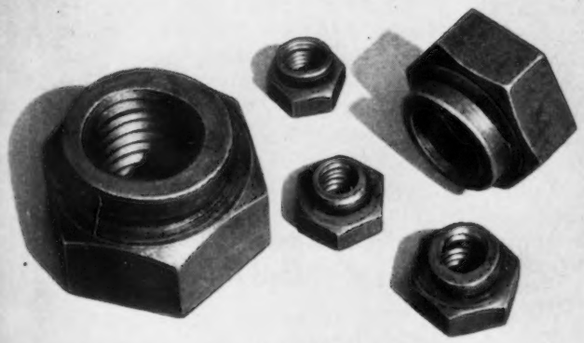
Milwaukee

• • • **Shortage of steel** has caused a layoff of 190 workers at the Pressed Steel Tank Co., which normally employs about 900 employees. The layoffs have been made during the last three weeks and probably will continue despite the fact that the firm is on a 24-hr. schedule and has some defense work in the plant.

FASTENINGS THAT *Speed Up* ASSEMBLIES

Lamson Pre-assembled Lock Washer screws are available in 8/32" to 5/16" diameters, and in lengths up to 1 1/2". Standard head styles are round head, binding head, oven head and hexagon head. Lamson & Sessions Company is a licensed manufacturer of this patented screw.

Phillips Recessed Head screws are stocked in all sizes with both standard machine screw threads and hardened self-tapping screw threads. Lamson & Sessions Company is a licensed manufacturer of this patented screw.



The new Stay-On Lock Nut keeps assemblies tight which are subject to severe vibration. Slotted crown section, eliptical in shape after heat treatment, grips bolt thread like a vise. One-piece design. Can be used repeatedly.

Lamson Hardened Sheet Metal screws are stocked in three standard types for metal and plastic assemblies. Types "A", "B" and "Z" are available with slotted or Phillips head. Type "C" Hardened Self-Tapping screws have American National Standard thread and also are available with slotted or Phillips Head.

• Right now taking up the slack in assembly time is of primary importance, and when you can do it and at the same time make a more secure, less costly assembly—common sense dictates utilizing every means to that end. And here are some of the outstanding "speed up" fastenings made by LAMSON & SESSIONS, produced by the millions in our five plants. All of these are "standard" fastenings—available out of stock except where demands of defense industries have temporarily drained our reserve supplies. If your product or assembly is not related to defense industry needs, you will of course understand that priorities must be satisfied first. Nevertheless we invite your inquiries for these time saving products.

•

THE LAMSON & SESSIONS COMPANY, Cleveland, Ohio

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

Your Jobber stocks the Lamson line

LAMSON & SESSIONS

BOLTS • • NUTS • • COTTERS • • CAP SCREWS • • SPECIALS

British Group Compares Our Labor Conditions to Theirs

Cleveland

• • • **Although refusing to** criticize American labor conditions, members of a British management and labor group hinted that an American "Dunkirk" will be necessary to end our strike troubles. Percy Lister, chairman of a British electrical and general engineering firm, told THE IRON AGE that "British labor and management were knitted firmly together after Dunkirk, and previous differences and work stoppage have been eliminated since that time." Mr. Lister pointed out that British workmen temporarily gave up their right to strike while management gave up its lock-out privilege.

Will Lawther, president of the Mine Workers' Federation of Great Britain, told THE IRON AGE that British labor has not surrendered its right to strike, but merely does not choose to exercise the right during the present crisis. Mr. Lawther suggested that labor here does not possess the self confidence instilled, by its long tradition, in British labor. He said that British miners work an 8-hr. day five days a week and a 7-hr. day on Saturday.

Meehanite Institute Will Meet Nov. 5 to 7

• • • **The annual meeting** of the Meehanite Research Institute of America, Inc., will be held at the Wade Park Manor, Cleveland, Nov. 5, 6, and 7. Research papers, prepared by institute members, will be presented and discussed, and representatives are expected from Meehanite foundries in the United States and Canada.

Foundry Men Meet at Purdue

Lafayette, Ind.

• • • **Discussion at the** Joint Regional Foundry Conference held at Purdue University Oct. 17-18, sponsored by Central Indiana, Michiana and Chicago chapters of American Foundrymen's Association, centered around defense shortages and demands. Clinic sessions were held on gray cast iron, malleable cast iron, steel and nonferrous metals.

Air Raid Shelter Equipment Ordered

Battle Creek, Mich.

• • • **The United Steel & Wire Co. is reported to be in production on parts for a $520,000 defense contract to supply air conditioning equipment for temporary and permanent air raid shelters. The contract was negotiated by the chemical warfare service of the War Department. The company normally manufactures trays and racks for refrigerators, wire baskets and other wire products. The new contract supplements to a great extent the normal activities which are curtailed by priorities.**

London Metals Group Meets

London

• • • **The Institute of Metals** held its twenty-third annual autumn meeting here on Sept. 17. The following papers were presented: "Causes of Porosity in Tin-Bronze Castings," by T. F. Pearson and W. A. Baker; "Unsoundness in Gravity Die-Cast Silicon-Aluminum Alloy Pistons," by R. T. Parker; "Influence of Crystal Structure on the Cold Rolling and Annealing of Copper Strip," by Maurice Cook and T. L. Richards; and "X-Ray Examination of the Crystal Structures of Rolled Magnesium and a Magnesium Alloy," by D. E. Thomas.

SAE Aircraft Meeting to Be Held Oct. 30-Nov. 1

• • • **The annual national** aircraft production meeting of the Society of Automotive Engineers will be held Oct. 30, 31 and Nov. 1, at the Biltmore Hotel, Los Angeles. The session will include fourteen technical papers and an aircraft engineering display.

Chicago Defense Show Planned

Chicago

• • • **The Junior Chamber of Commerce** here plans a defense equipment show to indicate the extent to which local firms can participate in defense manufacture.

Detroit Engineers Hear Talk on Metal Powders

Detroit

• • • **The metallurgical and** physical properties of metal powders were discussed by Floyd C. Kelley, of the General Electric Research Laboratories, Oct. 10 at a meeting of the Engineering Society of Detroit. His talk was illustrated by a series of photomicrographs on sintered metal compacts.

Dr. W. A. Mudge to Speak On Nickel Alloys

• • • **The manufacture,** properties, fabrication and uses of nickel and high-nickel corrosion-resisting alloys will be discussed by Dr. W. A. Mudge, before a joint meeting of the Boston sections of the American Welding Society and the American Institute of Mining and Metallurgical Engineers, at the Massachusetts Institute of Technology, Cambridge, Mass., on Monday evening, Nov. 3.

In connection with the lecture, the film "Nickel High-Lights" will be shown. Dr. Mudge will be assisted by K. M. Spicer. Both are with the International Nickel Co., Inc., New York.

Contract Clinic at Chicago Is Under Way

Chicago

• • • **A second** prime contractor-subcontractor defense clinic for this city will last three days, Oct. 22-24, at Stevens Hotel. The current clinic is sponsored by OPM which has assured subcontractors that the country's leading prime contractors will give full support to the clinic.

Dow Chemical Will Take Salt Wells at Ludington

• • • **The Dow Chemical Co.,** of Midland, Mich., is preparing to take over extensive salt well holdings at Ludington, Mich., including the wells and plants of the Morton Salt Co. The Dow Co. needs the by-products of the salt wells in the manufacture of magnesia and other materials important to the defense program.

Action Looms Against Priorities Violators

Washington

• • • **OPM's first** direct punitive action for alleged violations of priorities orders, which shuts off until March 31, 1942, all non-defense aluminum operations of the Central Pattern & Foundry Co., Chicago, will be followed by other investigations in the metal fields.

The aluminum suspension order came in the wake of OPA's action on Oct. 9 in negotiating with "one of the largest iron and steel scrap brokers and dealers" for the restitution of all amounts collected since Sept. 2 in excess of the ceiling scrap prices.

These two developments were described by defense officials as the beginning of an era in the defense program when all "necessary sanction" will be utilized to enforce all of OPM and OPA regulations.

Under provisions of the suspension order, the Chicago company may continue to use aluminum on hand to complete defense orders on its books as of Oct. 1, operations which are estimated by OPM to require about one month plus an estimated 288,000 lb. of aluminum to complete. The company also fabricates brass and zinc products, functions which are not affected by the OPM suspension order.

The company is charged with misrepresenting to the OPM its scheduled July aluminum shipments; failure to obtain required inventory statements and orders from its customer; and acceptance without authorization of deliveries of aluminum scrap. Major allegation made by OPM is that during July the firm shipped 41,449 lb. of aluminum products for non-essential uses in violation of the directions previously issued by the priorities division.

OPM Creates Bureau for Industrial Conservation

Washington

• • • **A new bureau** of industrial conservation whose job will be to salvage usable material and direct it into national defense channels was established early this week by OPM.

THIS WEEK'S Priorities and Prices

Repair and maintenance supplies for practically every industrial plant granted preference rating of A-10 in amendment to preference order P-22 issued Oct. 16. (OPM:PM1382)

First suspension order No. S-1, issued against Central Pattern & Foundry Co., Chicago, for allegedly diverting aluminum to non-defense uses. Order suspends company's aluminum operations until March 31, 1942. (OPM:PM1387)

Zinc, zinc dust and oxide, produced from secondary materials under toll agreements, exempted from emergency pool provisions of preference order M-11 in amendment issued Oct. 16. (OPM:T-20) Zinc scrap and secondary slab prices adjusted upward prices placed on shipping point basis and premiums set for quantity shipments in amendment to price schedule No. 3 issued Oct. 18. (OPA:PM1392)

Aluminum scrap and secondary ingot ceiling prices to be reduced 1c. to 3c. a lb. in amendment to price schedule No. 2 to be issued shortly. Premiums will be set for quantity shipments. (OPA:T18)

Certain refiners, ingot makers and other remelters of copper and copper base alloy scrap given A-10 priority rating for obtaining such scrap in preference order P-61 issued Oct. 14. (OPM:T15)

Warehouses which have not yet received their quotas, due to return of their reports by OPM for corrections, may continue to accept orders without their quotas until Oct. 31, instead of Oct. 5 as originally announced, in amendment to order M-21-b issued Oct. 14. (OPM:T11)

Passenger automobile production to be curtailed 51 per cent in January. (OPM:PM1380)

Pig iron producers required to file shipment schedules with OPM on 12th of each month, instead of the 15th as heretofore in amendment to order M-17 issued Oct. 14. Reports will be returned to producers on the 25th. (OPM:T9)

Waste in industry, government and among consumers to be studied by newly organized Bureau of Industrial Conservation, a division of OPM. (OPM:PM1369)

Tungsten consumers who use 100 lb. or less of contained tungsten a month are relieved of burden of filing monthly reports with OPM, according to supplementary order M-29-a issued Oct. 13. (OPM: T10)

Simplification and standards program inaugurated to promote conservation of scarce materials and protect consumers. (OPA: PM1365)

New field offices of Priorities Division opened in Memphis, Louisville, Nashville, Tenn., Helena, Mont., Knoxville, Tenn., New Orleans and Oklahoma City, Okla. (OPM:PM1362)

Construction projects which use critical materials may not be started during the emergency unless necessary for national defense or essential to health and safety in new SPAB policy. (SPAB:SPA9)

Chlorinated solvents placed under full priority control in preference order M-41 issued Oct. 15. (OPM:PM1377)

South American copper mines given priority rating for maintenance materials and operating supplies in order P-58 issued Oct. 15. (OPM:PM1376)

Commercial refrigeration and air conditioning industries sent questionnaires to ascertain where vital materials may be saved in those industries. (OPM:PM1379)

Highway construction granted priority assistance in order P-19-2-a. (OPM:PM1338)

Copper use in more than 100 civilian articles restricted to 60 per cent of 1940 consumption till Jan. 1, 1942, in order M-9-c issued Oct. 21. After that time copper use in specified articles prohibited except for decorative plating. (OPM:PM1396)

Acetone and normal butyl alcohol placed under price ceilings established Oct. 21. Acetone covered by price schedule No. 36, and butyl alcohol by schedule No. 37. (OPA:PM1401)

★ ★ ★

For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in parentheses after each paragraph (OPM-PM1300 means announcement 1300 issued by Office of Production Management.)

Metal Congress Gets Under Way

Philadelphia

• • • **Monday morning** saw the opening gun fired for the 23rd Metal Congress in Philadelphia, with its Metal Show and barrage of technical discussions by the sponsor of the Congress, the American Society for Metals, and other cooperating organizations; the Iron and Steel and the Institute of Metals Divisions of the American Institute of Mining and Metallurgical Engineers, the American Welding Society, and the Wire Association.

With the present National Defense efforts of the country foremost in the minds of attendants, most of the technical discussions are based on this theme, some pointing out methods of increasing production of defense materials, others methods of conserving and substituting materials, and the remaining interpreting highly technical and theoretical developments during the past year, showing how these findings can be utilized in preparing for defense of this country.

In conjunction with the papers and discussions of the various technical organizations, the series of National Defense Meetings, sponsored by the ASM and lead by various Army, Navy, OPM, and other government representatives, interpret the government's job in maintaining production, and cover conservation and substitution of materials, as well as new production methods and short cuts to greater production throughout the country. The National Defense Meetings permitted the civilian and military experts to meet on a common ground and discuss problems with which they are faced,

Canadian Firm Makes 5,000,000th Shell

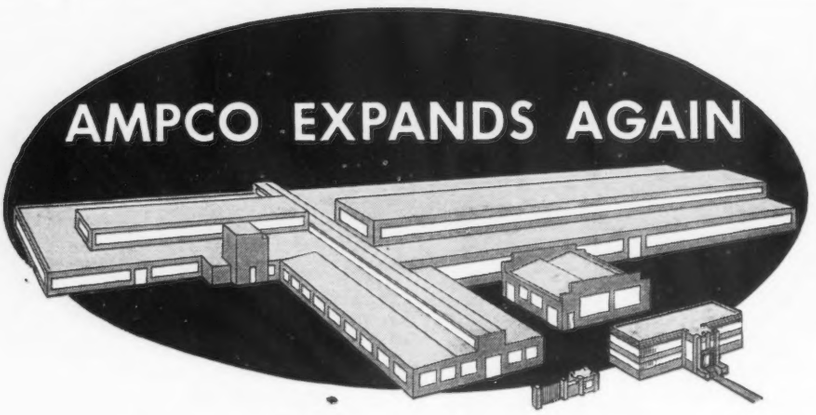
Hamilton

• • • **National Steel Car Corp., Ltd., engaged in manufacture of artillery and large anti-aircraft shells, in connection with which it holds big contracts from the British Government, on Oct. 15 turned out its 5,000,000th shell.**

Since the outbreak of war Canadian munitions plants produced 10,000,000 cartridge cases, the record being achieved on Oct. 7.

Many of the shells being made in Canada are now being filled in Canadian shell-filling plants and are shipped abroad as complete rounds of ammunition.

AMPCO EXPANDS AGAIN



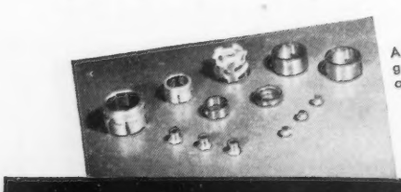
More Aluminum Bronze for American Industry

Another addition which doubles plant capacity — a production foundry that is streamlined to handle bronze castings on a volume basis — that is Ampco's latest contribution to National Defense activities.

The increasing demand for Ampco Metal, an alloy of the aluminum bronze class, and Ampco-made bronzes made this expansion imperative. Otherwise we couldn't render satisfactory service — couldn't keep our delivery promises — would have to "let down" some of our old-time customers.

Today Ampco is 98.5% defense. Our enlarged facilities enable us to take care of more industries that need the wear resistant qualities of Ampco Metal. Performance-conscious engineers who have wanted an alloy with high tensile strength, controlled hardness, resistance to wear, impact and corrosion, can now specify Ampco Metal with assurance that their production requirements will be met. Ask for catalog number 22 that tells about Ampco Metal's outstanding physical qualities.

AMPCO METAL INC., *Department* IR-1023, Milwaukee, Wis.



AIRCRAFT PARTS — a representative group of AMPCO-MADE aircraft parts, all precision machined by AMPCO.

MACHINE TOOLS—leading manufacturers standardize on AMPCO METAL because of its stubborn resistance to wear, "squashing out" and shock loads.

AMPCO METAL

The Metal Without An Equal

AMPCO

MRC Purchases 96,000 Tons Of South American Copper

• • • **Jesse Jones,** Federal Loan Administrator, announced that the Metals Reserve Co. purchased an additional 96,000 tons of Latin-American copper at 11.25c. per lb. c.i.f. New York for November and December shipment. Anaconda Copper Mining Co. is furnishing 62,000 tons of the copper and Kennecott Copper Corp. the remaining 34,000 tons.

Steel Exports Rise Sharply in August

Washington

• • • **Exports of iron** and steel products in August rose almost 140,000 gross tons over the July movement, totaling 617,477 tons and 478,016 tons, respectively, according to the Department of Commerce. For the eight months ended August of this year exports were 4,112,161 tons as compared with 4,521,568 tons in the corresponding period of 1940.

The largest items of exports in August were non-alloy ingots, blooms, etc., the total of 217,563 tons increasing 88 per cent over similar July exports of 115,778 tons. Pig iron exports ranked second, amounting to 64,925 tons, in July, or slightly above the 63,057 tons total of the preceding month. Exports of scrap in August aggregated 80,255 tons, a 34 per cent increase over July scrap exports of 59,905 tons.

Priorities Clinic Series Arranged by OPM

Washington

• • • **OPM this week** planned a series of industrial and regional priorities clinics. The meetings are scheduled for Minneapolis on Nov. 3; Cincinnati on Nov. 5; Indianapolis on Nov. 6; Rochester, N. Y., on Nov. 11; East Orange, N. J. on Nov. 14, and Pittsburgh on Nov. 18.

Three Exhibit Trains To Aid Contracting

Washington

• • • **Three special** exhibit trains, carrying samples on defense equipment and parts for acquainting prospective defense manufacturers with government armament needs, will tour the country beginning Nov. 10, as part of a program arranged by OPM'S new Division of Contract Distribution.

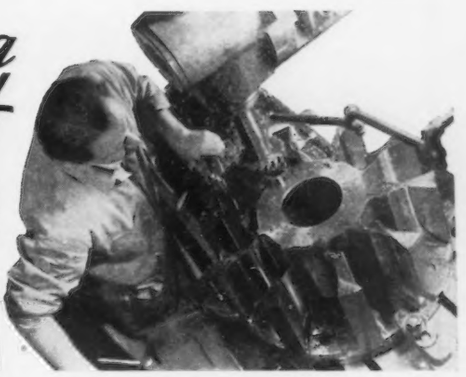
An estimated 30,000 small manufacturers will be interviewed during the course of a month while one train travels the eastern seaboard, the second swings through the middle east, and the third goes to the west coast to return via the south.

Foundry Equipment Sales Rise Sharply

• • • **Sales of foundry** equipment rose sharply in September, but did not quite reach the record level attained in April, the Foundry Equipment Manufacturers Association reports. The association's index of all sales stood at 363.8 per cent in September, as compared with 312.9 in August and 377.2 in April, the latter being the high of the current movement. The gain was due entirely to sales of new equipment, an index covering this activity only rose from 298.2 in August to 372 in September. The index covering repairs only declined to 339.2 for September from 356.9 in August.

When it's a question of

LIGHT COLOR *and* **HIGH CUTTING QUALITY**



Insist on **Stuart's "SUPER-KOOL"**

America's First Transparent Sulphurized Cutting Oil

WHILE it is scientifically recognized that dark colored sulphurized cutting oils are superior to light colored oils for the very "tough" metal cutting operations, there are many classes of machining for which transparent cutting fluids may be used without affecting performance values. As the leading example of light colored transparent sulphurized cutting oil STUART'S "SUPER-KOOL" offers many unique and exclusive advantages:

1. Permanent sulphur content. No precipitation in drum or storage tank—summer or winter. No appreciable loss in cutting quality after centrifuging.
2. Free from the slightest objectionable odor.
3. Pale amber in color and transparent when blended with paraffin oil or equivalent.
4. Less base required to match a given standard of cutting quality and therefore more economical.
5. Recommended by foremost machine tool builders and used in thousands of metal working machines for cutting, grinding and deep drawing.

Put "SUPER-KOOL" advantages to work for you Now! Sold as a base or in ready-to-use mixtures for *Steel, Brass, Bronze* and *Aluminum.*

WRITE FOR new booklet—"Stuart Oils—The Straight Line to Metal Working Efficiency." It describes in detail many of the utilities of the highly recommended tool lubricant—"SUPER-KOOL". Free to personnel of metal working plants.

For All Cutting Fluid Problems

D. A. STUART OIL CO.

Chicago, U.S.A. • LIMITED • Est. 1865

Warehouses in All Principal Metal Working Centers

ALLOY STEELS

Offer a Scrap Problem

● Despite the growing demand and consequent shortage of most grades of iron and steel scrap, there is an apparent surplus of certain grades of alloy steel scrap.

● The Office of Production Management has requested users of alloy steels to separate their alloy scrap from their carbon steel supply. This many of them are doing only to find that the market for alloy scrap, particularly of low nickel content steel turnings, is highly restricted.

● As the National Defense Program expands, production of nickel steel scrap will increase and much of it will not be utilized unless a market is found for such material.

● Offerings of such scrap include turnings in which the guaranteed nickel content is not over 2%. Some contain chromium, some are virtually free of this element, other grades range in nickel content from 1 to 5 per cent. Chunky nickel steel parts of similar analysis are available.

● It is our desire to assist producers and dealers to locate markets for this scrap.

● We invite inquiries by telephone or letter.

The CHARLES DREIFUS Company

(SCRAP BROKERS FOR 40 YEARS)

Philadelphia, Pa.
Widener Bldg.
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

Worcester, Mass.
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Worcester 6-2535

Strike Paralyzes Southern Plants

Birmingham

• • • **Iron pipe** plants and practically every other defense industry in the Birmingham area not manufacturing its own gas were either down Oct. 21 or suffered curtailed operations following a strike of by-product and blast furnace workers Oct. 20 at Sloss-Sheffield Steel & Iron Co.

Thousands of men were affected in defense industries here after the Sloss by-product plant closed down following a strike of the company's by-product and blast furnace workers, members of District 50, United Mine Workers of America. The company, which banked its four blast furnaces, is one of the two major suppliers of gas for domestic and industrial use in this area.

Companies affected by inability to obtain gas included American Cast Iron Pipe Co., National Cast Iron Pipe, U. S. Pipe Co. and Stockham Pipe Fittings Co. The shutdown was the most serious in Alabama's history.

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Mediators Seek to Avert Aircraft Strike

• • • **Mediators** were trying Tuesday to avert work stoppages at two plants of Bell Aircraft Corp. Meanwhile, workers returned to the Consolidated Aircraft plant on the West Coast and to the Midland Steel Products Co. plant at Cleveland. The latter strike affected jobs of 1400 at Cleveland and 14,000 in the automotive industry.

A threat to lay before President Roosevelt the dispute at Air Associates, Inc., Bendix, N. J., had not materialized Tuesday. F. Leroy Hill, president of the company, issued a statement Monday bitterly attacking the Defense Mediation Board for its handling of the case.

After demands for a 20c.-per-hr. wage increase, a union shop and check-off were refused the CIO by the Bell Aircraft Corp. in a meeting Oct. 17, union officials declared that they were authorized by the union to call a strike in both of the Bell plants, at Buffalo and Niagara.

There were 29 defense strikes current Oct. 18, according to OPM's labor division. Seven cases, involving approximately 11,000 workers, were viewed as "unusually dangerous" to the defense program. These were: Lakeside Steel Improvement Co., Cleveland; National Steel Corp., Ecorse, Mich.; Shanango Penn Mold Co., Sharpsville, Pa., and Neville Island, Pa.; Tube Reducing Corp., Wallington, N. J.; Anaconda Wire & Cable Co., Muskegon, Mich.; American Engineering Co., Philadelphia, and Air Associates, Bendix, N. J.

The Anaconda stoppage began Sept. 19 and the Air Associates dispute began Sept. 30. Most of the others listed began in mid-October.

For details on Great Lakes Steel strike see "Assembly Line," page 60. For story on effect of Chicago strikes see page 86

Coming Events

Oct. 20 to 24—National Metal Congress, Philadelphia. Annual meeting of American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers, and Wire Association. Also Exposition of equipment, materials and processes.

Oct. 23 and 24—Society of Automotive Engineers, Tulsa, Okla.

Oct. 24 and 25—Foundry Equipment Manufacturers' Association, annual meeting, White Sulphur Springs, W. Va.

Oct. 28 to 31—National Association of Refrigerating Engineers, Detroit.

Oct. 30 to Nov. 1—Society of Automotive Engineers, National aircraft production meeting, Biltmore Hotel, Los Angeles.

Nov. 10 to 12—National Aircraft Standards Committee, annual meeting, Hotel Lexington, New York.

Nov. 13 and 14—Society of Automotive Engineers, National Transportation and Maintenance Meeting, Hotel Statler, Cleveland.

Dec. 1 to 6—18th Exposition of Chemical Industries, Grand Central Palace, New York.

*Dec. 6 to 13—National Motor Truck Show, Philadelphia.

January, 1942—American Society of Heating & Ventilating Engineers, annual exposition, Philadelphia.

Jan. 12 to 16—Society of Automotive Engineers, annual meeting and engineering display, Detroit.

Jan. 20 to 22—Western Retail Implement & Hardware Association, annual exposition, Kansas City.

Feb. 23 to 28—Automotive Service Industries Show, Atlantic City, N. J.

April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.

*Tentative.

Brazil Orders Steel Mill Equipment Here

Cleveland

• • • **Within the past ten days steel mill equiment orders totaling about $7,000,000 were announced by Col. de Macedo Soares, head of the Brazilian Purchasing Commission. These included a $2,600,000 continuous hot strip mill and a cold reducing mill to be built by Mesta Machine Co., Pittsburgh; a $2,264,755 plate mill to be built by United Engineering & Foundry Corp., Pittsburgh; a $2,000,000 rail and structural mill by Morgan Engineering Co., Alliance, Ohio, and $24,419 in core-drill equipment purchased from Ingersoll-Rand, New York.**

QMC's New Policy Takes Emphasis Off Prices

Washington

• • • **As part** of the program to spread defense orders, the Quartermaster Corps has adopted a new purchasing policy under which awards will be made on a regional basis and prices will no longer be the dominating factor.

The department plans to limit maximum quantities awarded to any bidder while awards will be made to as many regions, and to as many suppliers in each region as is possible. Within reasonable limits, depending upon circumstances surrounding individual procurement orders, bid prices will not always govern the award of contracts, the department said. Direct negotiations will be made with bidders in a particular region where it is desired to make awards, when the bid prices are considered too high. It promised that every reasonable effort will be made to induce such bidders to accept a stated quantity of what is considered a fair price.

In an effort to eliminate another possible source of trouble in getting widespread distribution of awards, because of the presence of large, efficient and low-cost producers of any particular item in a region, procurement officers of the Quartermaster Corps have been given authority to rotate orders among responsible bidders. Under such a plan, bids whether low or not, of previously successful bidders for any items involved, will be disregarded to the extent necessary to accomplish the principle of rotation and distribution of awards.

Here's the latest Metal Cleaning Data you've been looking for!

IT'S YOURS FOR THE ASKING!

Here is the latest data on cleaning shells, shell cases, cartridges, fuse parts and all other munitions.

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MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

46 SOUTH AVENUE GARWOOD, N. J.

MAGNUS CLEANERS

Tool Engineers Turn To War Production

(CONTINUED FROM PAGE 47)

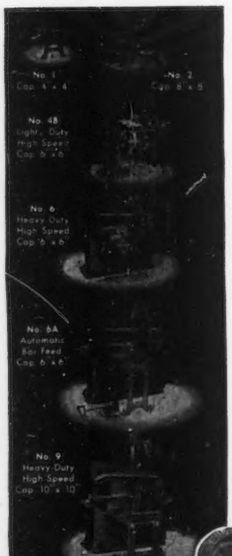
the finished cuts on high speed steel tools after they have been roughed out and then hardened. By using a negative back rake on the tools, this carbide can take interrupted cuts on alloy steel parts without failure.

The session on cutting tools was concluded by a talk on recent developments in cutting oils, delivered by Walter Esau of the E. F. Houghton Co., Philadelphia. Delving into the theory of chip formation, Mr. Esau pointed out that the metal in the chip breaks down ahead of the cutting tool by fracturing through the soft ferrite grains rather than at the harder boundary material composed of iron carbides. If the cut is made fast enough to generate sufficient heat, the ferrite grains will reweld themselves, and it is this action that causes the formation of long chips. Much better surface finish and cutting action is obtained if rewelding is prevented, observed by the presence of short steel chips, and it is in this phase that one function of a cutting oil becomes important. An ideal coolant would be one that would have sufficient penetrating power to get into the slip planes and prevent rewelding. At the same time the volume of coolant supplied tends to lower the temperature of the chip and also acts as a lubricant between the chip and the tool face.

It has long been recognized, Mr. Esau said, that sulphur or chlorine have an E-P effect through the formation of sulphides or chlorides of iron. Such compounds tend to glaze the tip of the tool and reduce friction between tool and chip. But, in order to prevent rewelding also, it is necessary for the sulphur to get into the minute crevices created by the shearing action on the ferrite grains. This effect is now being obtained through the compounding of penetrating oils or wetting agents in the coolant. These wetting agents were originally developed for quenching oils and are valuable not only in compounding mineral oils but also with soluble oils used in grinding.

While sulphur is recognized as the chief element in E-P lubricants, Mr. Esau emphasized that its action largely depended upon the form in which the sulphur existed. Mexican crude oils, which are high in sulphur, for example, are no good as an E-P lubricant. Flowers of sulphur suspended in colloidal form in straight mineral oil is equally ineffective. But if the sulphur is first compounded chemically with a lard oil or if it is mixed with an unsaturated asphalt base mineral oil, then the sulphur is in a form that will react with the metal being cut so as to form the sulphides mentioned above. Summarizing, the speaker said that the best kind of cutting oil consisted of a sulphur-

"Versatility" and "Speed" Characterize these two MARVEL SAWS



For the stockroom of this special furnace builder, what better combination could you ask . . . a MARVEL No. 8 Metal Cutting Band Saw for versatility, and a MARVEL No. 4B High Speed Hack Saw for miscellaneous cutting-off.

For all-around versatility, the universal No. 8 Saw is unequalled. It will cut at any angle from 45° right to 45° left; will nip off a ⅛" drill rod or cut down an 18"x18" die block. It has a large "T"-slotted planer type table for setting up big work and a quick action machine vise for small pieces. It has a combination hand and/or power feed. It does cutting-off, mitering, notching and indexing, and saves hours of machining by roughing pieces and parts to size or shape. In many shops it eliminates warehouse delays and "cutting extras."

The MARVEL 4B Hack Saw is an exceedingly fast-cutting, light-duty saw (Capacity 6"x6") designed for high-speed cutting-off. It is designed for miscellaneous "run-of-the-hook work" and is surpassed in speed only by the heavy-duty, all-ball-bearing MARVEL 6, 6A, 9 or 9A High-Speed Saws.

ARMSTRONG-BLUM MFG. COMPANY
5700 Bloomingdale Ave. "The Hack Saw People" Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York

ized lard oil or other saponifiable oil blended with a straight mineral oil. One of the most recent developments in blended oils is the substitution of synthetic fats or oxidized organic oils for lard oil or vegetable oils.

Training Problems

The closing technical session on Saturday morning was devoted to the problem of training personnel. The school's place in the picture was presented by Roy M. Sherk, director of war emergency classes, Western Technical School, Toronto, who before launching into a description of emergency training programs, first pleaded for the cooperation of industry in absorbing graduates of the four-year technical high school courses who often went begging in peacetime. Graduates of such courses, he said, are ideally fitted for going into apprentice training courses in industry.

Canada now has 100 training centers where short term training courses are given for war industries. Shops of vocational and technical high schools are used for this work after the regular day classes have been dismissed and are operated on practically a 24-hr. basis. Courses vary from two to 12 weeks in length, depending upon the subject matter and usually the classes are sponsored by local industries which are in need of certain classes of workers. Unlike the condition in the United States, trainees are given a subsistence wage, varying from $3 a week for a boy living at home to $12 for a married man, during the time they are in school. Training costs average 55 to 60c. per student per day, not counting subsistence costs and equipment costs. The cost of new equipment is shared between the dominion and the province.

Both Mr. Sherk and the speaker that followed, Edward Kennard, plant manager, St. Catharines Steel Products, agreed that close personal contact between industry and the schools is essential. In the first place, Mr. Kennard pointed out, it is necessary for each industry to decide what kind of skills it wishes to have these persons trained for and the number of each classification, as well as the minimum requirements for acceptance in the training program. He suggested classifying all jobs to be filled and charting these data.

Charting Training Needs

The speaker illustrated by charts how one large plant getting into the manufacture of machine guns had broken down the requirements of a typical department in terms of personnel. In the instance cited, out of a hundred workers, there would be required 30 milling machine operators, 10 lathe operators, 10 drillers, five grinder hands, 12 general workers, 25 hand workers and eight junior inspectors. For each of these types of jobs, selection standards were set up on the basis of age, health, craft sense, intelligence, experience and education. Then for each course, which for this particular plant was limited

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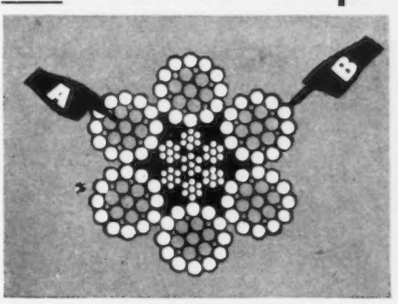

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PLUS INTERNAL LUBRICATION . . . which protects unseen, inside wires which are the reserve strength of your rope upon which safety depends.

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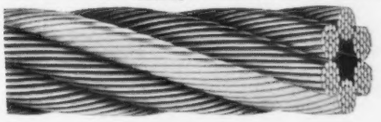
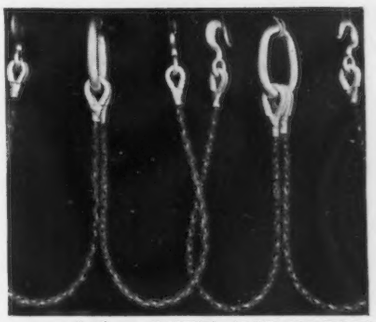


MACWHYTE
ATLAS SLINGS



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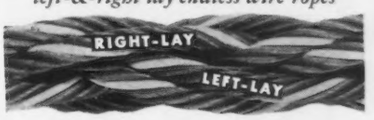

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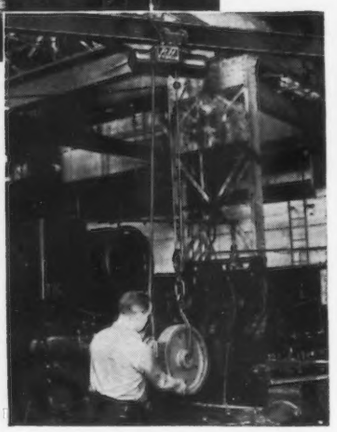

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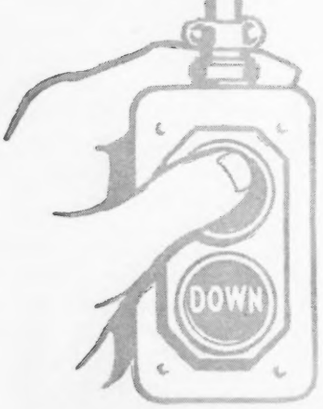

The Zip-Lift operates on any standard electric circuit. Before you buy any hoist, between 250 lb. and 2,000 lb. capacity, see the new Zip-Lift! Prices start at only $140.00. Write for Bulletin H-20.

No tugging of ropes or yanking of chains! Just press these buttons and the Zip-Lift answers with smooth lifting and lowering of loads. The operator, with one free hand to guide the load, can also pull the fully loaded hoist by the conductor cable without danger of shorting or "blowing" control. This simplified full magnetic push button station is one of the many important advantages enjoyed by Zip-Lift users.

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★ *The lightest weight push button handling only the control circuit — not the full motor current. No expensive replacements if damaged. Also permits simplified limit switch, again handling only auxiliary current . . . the same as on all heavy duty electric hoists and cranes.*

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to 200 hr., the subject matter to be taught and the length of time on each subject was determined and charted. Similarly, the amount of school equipment necessary was estimated so that additional school training machines could be obtained, if necessary.

It was also necessary, Mr. Kennard said, to estimate the rate of absorption of trainees in the new plant and parenthetically he added that is best to underestimate the requirements since trained workers cannot be readily "stored" until needed. In this connection a study of the employment curve of the plant when a similar new project was undertaken was very useful in determining the number of new workers required each month. In the beginning few workers are needed, but as the plant become organized, the rate of new hiring reaches a maximum, then declines as operations become stabilized.

In the discussion that followed, it was brought out that girls have been successfully trained for machine shop work by means of these short courses. These girls, seen in large numbers in defense plants by touring members of the A.S.T.E., were said to be most cooperative and willing to do precisely as told. They seem much happier on routine work than men and are very quick and accurate on light assembly work. In fact, both teachers and industrial executives appeared delighted with them. High caliber women have been put into supervisory work after relatively short training. Many of the tooling set-ups were designed with the use of women operators in mind.

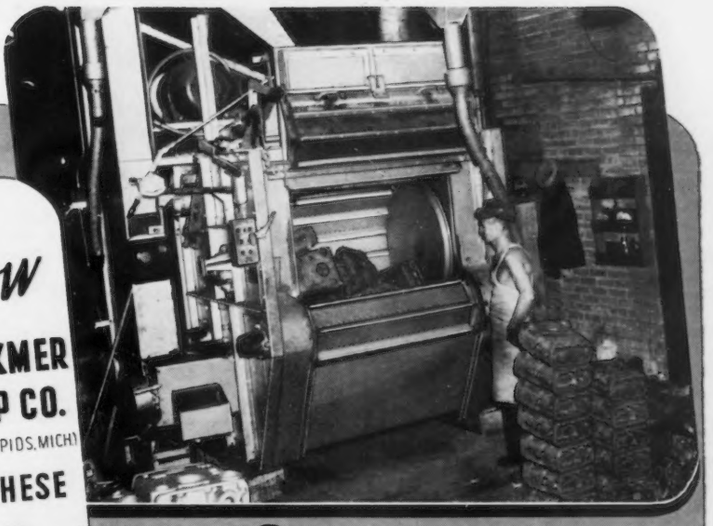
Book on Tool Design Written by C. B. Cole

• • • **As a companion piece** to his book on tool making published last year, C. B. Cole, consulting mechanical engineer and president, Tool Equipment Sales Co., Chicago, has written a new book on "Tool Design." This 500-page volume has been published by the American Technical Society, Chicago. Dealing with the fundamentals of design as applied to tooling for production, for illustrations particularly, the book draws upon the author's wide experience in designing jigs, fixtures and special cutters for the automotive and farm implement fields.

Government Awards . . .

War Dept., Ordnance:

Allegheny Ludlum Steel Corp., Brackenridge, Pa.; gages $6,160
American Brass Co., Waterbury, Conn.; brass 1,047,199
American Manganese Bronze Co., Philadelphia; bronze, manganese 13,882
American Steel & Wire Co., New York; nails 1,040
American Type Founders, Inc., Elizabeth, N. J.; guns 3,995,850
Atlas Press Company, Kalamazoo, Mich.; machines, spindle drilling 1,060
Barbour-Stockwell Co., Cambridge, Mass.; iron castings 1,792
Barcalo Mfg. Co., Buffalo; wrenches 4,733
W. F. Barnes & John Co., Rockford, Ill.; shot 4,000,000
Barwood & Co., Philadelphia; gages 1,040
Baush Machine Tool Co., Springfield, Mass.; machines, screw tapping, with spindles 3,321
Bellevue Industrial Furnace Co., Detroit; furnaces 8,117
Bethlehem Steel Co., Bethlehem; steel 1,476
Bliss & Laughlin, Inc., Harvey, Ill.; steel 10,798
Carnegie-Illinois Steel Corp., Boston; steel 10,542
Carpenter Steel Corp., Philadelphia; drill rods 2,367
Chase Brass & Copper Co., Waterbury, Conn.; bronze, manganese 1,443
Cincinnati Electrical Tool Co., Cincinnati; pedestal grinders 1,499
Cincinnati Milling Machine Co., Cincinnati; milling machines ... 4,179
Clark Tructractor, Battle Creek, Mich.; utilitrucs 7,760
Colonial Broach Co., Detroit; broaches and serration drifts .. 4,451
Colt's Patent Fire Arms Mfg. Co., Hartford; sears 1,089
Columbus Forge & Iron Co., Columbus, Ohio; forgings 1,129
Crucible Steel Co. of America, New York; bits, tool, steel 1,113
Cutler-Hammer, Inc., Boston; parts for drum controller 2,306
Dana Tool-D Nast Machinery Co., Philadelphia; twist drills and taps 2,740
saws 5,280
Henry Disston & Son, Inc., Philadelphia; steel plate 8,551
Doehler Die Casting Co., Pottstown, Pa.; booster cups 5,593
Electric Arc Cutting & Welding Co., Newark; parts for generating units 2,120
Electric Household Utilities Corp., Hurley Machine Division, Cicero, Ill.; boosters 854,199
C. E. Erickson Co., Inc., Des Moines, Iowa; cartridge cases, tools, punches, dies and gages .. 217,796
Federal Products Corp., Providence; gages 9,310
Federal Tool Corp., Chicago; gages 5,328
Firth-Sterling Steel Co., McKeesport, Pa.; dies 1,908
Florence Stove Co., Gardner, Mass.; ammunition boxes 370,000
Ford Motor Co., Dearborn, Mich.; brake assemblies 6,440
Foxboro Co., Foxboro, Mass.; indicating controllers 1,178
Franklin Electric Co., Philadelphia; wire, fuses and clamps 2,715
Gairing Tool Co., Detroit; reamers 1,780
Garman Tool & Die Co., Detroit; gages 1,170
General Motors Sales Corp., New Departure Division, Bristol, Conn.; ball bearings 7,078
Genesee Tool Co., Fenton, Mich.; cutting tools 4,267
George Gorton Machine Co., Racine, Wis.; duplicators 3,708
Goss and DeLeeuw Machine Co., New Britain, Conn.; attachments, threading, and chucks .. 37,750



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A YEAR ago the Blackmer Pump Co., Grand Rapids, Michigan, installed a 36" x 42" WHEELABRATOR Tumblast for cleaning pump and automotive castings, weighing from 1 to 65 pounds each.

Mr. J. W. Livingston, Foundry Sup't. says: "The WHEELABRATOR not only turns out a better job of cleaning and gives a better appearance, but it does the job three times as fast as our old sand blast method. It has also reduced the number of men employed in the cleaning department from three, and sometimes four men, to a single operator.

"Tool life is another factor that has been improved on many jobs. With the old method the castings were not sufficiently cleaned, with the consequence that milling cutters lasted for only 400 to 500 jobs, whereas now, after WHEELABRATING, the cutters turn out in excess of 1500 jobs before replacement is necessary.

"I know from experience that we simply couldn't get out the present volume of work and have the excellent appearance that our work now has unless we had this WHEELABRATOR".

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TRADE MARK

THE AMERICAN MOLDER

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510 S. BYRKIT ST. MISHAWAKA, IND.

Great Lakes Steel Corp., Detroit; steel 8,499
Greenfield Tap & Die Corp., Greenfield, Mass.; gages 2,014
Guiberson Diesel Engine Co., Chicago; material to assemble diesel fan segments, flywheels and levers 1,342
Hannifin Mfg. Co., Chicago; recoil mechanisms 396,274
Harrington & King Perforating Co., Chicago; tubes 1,434
Heim Company, Fairfield, Conn.; polishing machines 6,882
Hesse Machine & Mfg. Co., Inc., Boston; gages 9,056
High Speed Hammer Co., Rochester, N. Y.; spinning machines .. 6,015
High Standard Mfg. Co., New Haven, Conn.; guns 6,755,791
Imperial Brass Mfg. Co., Chicago; parts for tanks 1,278
Industrial Monorail & Conveyor Co., Philadelphia; electric hoist. 1,030
JCH Automatic Machine Works, Philadelphia; knurls 2,475
Johnson Claflin Corp., Marlboro, Mass.; gages 1,110
Jones & Lamson Machine Co., Springfield, Vt.; wheel truing devices 1,380
Jones & Laughlin Steel Corp., Pittsburgh; steel 8,113
Kingsbury Machine Tool Corp., Keene, N. H.; clutches 1,107
LaPointe Machine Tool Co., Hudson, Mass.; square broaches ... 1,239
Latham Machine Co., Pittsburgh; gages 1,118
Letts Drop Forge, Inc., Detroit; forgings 1,008
Lincoln Electric Co., Cleveland; welding machines 4,215
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages ... 2,875
Link-Belt Co., Chicago; carriage and recoil mechanism 286,200
Magnus Tool & Die Co., Newark; punches 5,405
E. J. Manville Machine Co., Waterbury, Conn.; punches and dies.. 10,957
cold headers 7,650
T. F. McGann & Sons Co., Boston; bronze castings 1,350
McGonegal Mfg. Co., East Rutherford, N. J.; grinders with spindle and motor bearings 2,567
Mechanical Laboratories, Inc., Pittsburgh; gages 1,548
Metal Goods Corp., St. Louis; brass and copper tubing 2,620
Micromatic Hone Corp., Detroit; honing tools and micromatic shells 41,951
Midwest Tool & Mfg. Co., Detroit; cutting tools 1,546
Miller Co., Meriden, Conn.; brass. 12,522
Milwaukee Gas Specialty Co., Milwaukee, Wis.; fuzes 249,992
Modern Die and Machine Co., Boston; milling fixtures 1,115
Mohawk Machine & Tool Co., New York; gages 1,680
Morgan Machine Co., Rochester, N. Y.; nailing machines 9,524
Morton Mfg. Co., Chicago; ammunition chests 62,181
Motris Truck & Wheel Co., Inc., Philadelphia; trucks 3,450
National Cash Register Co., Dayton, Ohio; fuses 658,050
National Twist Drill & Tool Co., Detroit; steel drills 1,862
Nerman-Crosby Steel Corp., New York; steel 27,820
Newark Gear Cutting Machine Co., Newark; gear hobbing machines 36,804
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; attachments, precision locating, and spindle 975
machine tools 462,658
Norton Co., Philadelphia; grinding wheels 2,532
Nunn Mfg. Co., Evanston, Ill.; shells 91,780
Oliver Machinery Co., Grand Rapids, Mich.; spare parts for sawing machines 29,315
Otis Steel Co., Cleveland; steel .. 2,712
Pipe Machinery Co., Cleveland; gages 3,047
Precision Mfg. Co., Philadelphia; gages 1,425
Pullman Standard Car Mfg. Co., Chicago; suspension wheels 2,196
Republic Steel Corp., Chicago; steel 1,056
Revere Copper & Brass, Inc., Baltimore; cartridge brass clippings. 445,637
copper 1,384
Reynolds Metals Co., Louisville, Ky.; rods 5,321
Rheem Mfg. Co., Chicago; fin assemblies 112,500
Riverside Metal Co., Riverside, N. J.; bronze bars 1,767
Rodgers Hydraulic, Inc., Minneapolis; electric presses 1,156
Joseph T. Ryerson & Son, Inc., Chicago; steel 2,184
St. Pierre Chain Corp., Worcester, Mass.; forgings 70,757
George Sall Metals Co., Philadelphia; lead 1,682
Samson-United Corp., Rochester; anvils and strikers 63,750
Savage Tool Co., Minneapolis;

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Here Atlas-designed, Atlas-built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

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Engineers **CLEVELAND, OHIO** ***Manufacturers***

serving the world with mobile handling equipment

grinding machines 10,900
George Scherr Co., New York; gages 1,141
William Schollhorn Co., New Haven, Conn.; pliers 23,646
Scovill Mfg. Co., Waterbury, Conn.; cartridge cases 155,120
fuzes 247,500
W. E. Shipley Machinery Co., Philadelphia; parts for screw machines 1,378
Smith-Foley Co., Philadelphia; boring bars and collars 2,175
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gages 2,073
Stanley Works, Stanley Tool Division, New Britain, Conn.; breast drills 1,315
Sterling Products Co., Moline, Ill.; chain hoists 1,350
Suburban-Essex Machinists, Inc., Orange, N. J.; gages 4,717
Summerill Tubing Co., Bridgeport, Pa.; steel tubing 38,511
Surface Combustion Corp., Toledo, Ohio; temperature controls for furnaces 4,232
Thomas Steel Co., Warren, Ohio; steel 2,148
Thompson Wire Co., Boston; steel 32,045
Thomson-Gibb Electric Welding Co., Lynn, Mass.; dial stands 1,816
Timken Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis.; parts for tanks 1,242,258
gears 14,250
Titeflex Metal Hose Co., Newark; tubes for tanks 5,622
Tobin-Arp Mfg. Co., Minneapolis; boring machines 29,808
Tools & Gages, Inc., Cleveland; gages 5,448
Triad Tool & Die Co., Newark; punches and wrenches 2,695
Triplex Machine Tool Corp., New York; hydraulic press 1,900
Underwood-Elliott-Fisher Co., Hartford; parts for primers 48,830
Unique Specialties Co., New York; guides and holders 4,200
United Aircraft Corp., Pratt & Whitney Aircraft Division, East Hartford; flanges for tanks 2,326
U. S. Electrical Motors, Inc., Milford, Conn.; motors, geared head 1,900
U. S. Tool Co., Inc., Ampere, N. J.; milling machines 7,390
Universal Fixture Corp., New York; steel 1,075
Van Norman Machine Tool Co., Springfield, Mass.; boring machines and tool bits 14,842
Veit & Young, Philadelphia; spindles 1,650
Vinco Corp., Detroit; gages 1,650
Wallace Supplies Mfg. Co., Chicago; forming and cutting rectangular tubing 17,378
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; headers and accessories 17,956
Watson-Stillman Co., Roselle, N. J.; assemblies, spring, punches, noses, etc. 10,114
Western Cartridge Co., East Alton, Ill.; cartridges 6,202
Westinghouse Electric & Mfg. Co., Albany, N. Y.; stokers 6,191
Wiedemann Machine Co., Philadelphia; gages 8,870
Willys-Overland Motors, Inc., Toledo, Ohio; shells 5,078,370
John Wood Mfg. Co., Inc., Chicago; cartridge cases 107,280
Zimmerman Steel Co., Betendorf, Iowa; steel castings 60,090
steel 42,366

War Dept., Air Corps:

Bell Aircraft Corp., Buffalo; assemblies $87,912
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; airspeed indicators 1,210,320
Bradford Machine Tool Company, Cincinnati; lathes, precision, toolroom, etc. 226,500
Candler-Hill Corp., Detroit, Mich.; parts for maintaining and repairing fuel pumps 51,129
Continental Motors Corp., Muskegon, Mich.; maintenance parts for engines 277,120
Douglas Aircraft Co., Inc., Santa Monica, Cal.; airplane equipment 91,356
Duro Company, Dayton, Ohio; assemblies 94,800
General Motors Corp., New York; hardware 385,190
General Motors Corp., General Motors Overseas Operations, New York; hardware 418,014
C. H. Gosinger Machinery Co., Dayton, Ohio; precision lathes 300,566
Herzog Iron Works, Inc., St. Paul; assemblies 11,552
Iron Fireman Mfg. Co., Portland, Ore.; mount assemblies 553,796
Walter Kidde & Co., Inc., New York; fire extinguishers 2,805,966
E. A. Kinsey Company, Cincinnati; precision lathes 198,960
Klauer Manufacturing Co., Dubuque, Iowa; trucks, snow remover 6,964
Leece-Neville Co., Cleveland; assemblies 240,625
Linde Air Products Co., New York; acetylene cylinders 61,000
Lockheed Aircraft Corp., Burbank, Cal.; maintenance parts 64,171

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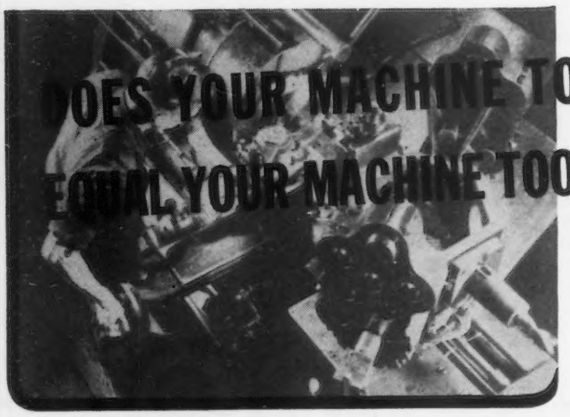
Magnavox Company, Inc., Fort Wayne, Ind.; assemblies 44,200
Manning, Maxwell and Moore, Inc., Bridgeport, Conn.; gage units 372,614
Moore Eastwood & Co., Dayton, Ohio; assemblies 99,975
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; precision lathes 214,800
Parker Appliance Co., Cleveland; aircraft fittings, etc. 240,210
Republic Aviation Corp., Farmingdale, L. I.; maintenance parts.. 3,130,349
Service Tool & Engineering Co., Dayton, Ohio; assemblies 187,884
Charles E. Smith & Sons Co., Cincinnati; assemblies 328,080
Sparks-Withington Co., Jackson, Mich.; bomb hoist assemblies .. 633,148
Spriesch Tool and Mfg. Co., Inc., Buffalo; assemblies 367,400
Square D Company, Kollsman Instrument Division, Elmhurst, N. Y.; pilot tubes, etc. 4,689,233
Warner Industries, Inc., Cincinnati; target assemblies, tow ... 518,400
Webster Electric Company, Racine, Wis.; assemblies 98,890
Westinghouse Electric & Mfg. Co., Dayton, Ohio; assemblies 56,438
Wright Aeronautical Corp., Paterson, N. J.; propeller and hub assemblies, test cowlings and rocker box covers 73,961
Yale & Towne Mfg. Co., Stamford, Conn.; pump assemblies 505,000

War Dept., Engineer Corps:

American Saw Mill Machinery Co., New York; saw mills and parts $3,364
Dorsey C. Anderson, Philadelphia; electric welders 2,124
Associated Mfrs., Inc., Atlanta; dump trucks, Grimes Advanced Single Engine Flying School, Dothan, Ala. 31,875
Bethlehem Steel Co., Bethlehem, Pa.; rails, splice bars, bolts, ties and rail clamps 41,532
turnouts 9,800
Briggs-Weaver Machinery Co., Dallas; metal shaper with standard equipment, Aircraft Assembly Plant, Fort Worth, Texas 8,500
Brown & Sharpe Mfg. Co., Providence; automatic screw machine and accessories, Aircraft Assembly Plant, Fort Worth, Texas .. 6,950
Bryant Machine & Engineering Co., Chicago; jig boring machines and accessories, Aircraft Assembly Plant, Fort Worth, Texas 9,606
P. B. Buller Co., Omaha; rivet coolers, Aircraft Assembly Plant, Fort Crook, Neb. 2,887
Carey Machinery & Supply Co., Baltimore; lathes 24,518
Caterpillar Tractor Co., Washington; tractors and parts 21,783
Champion Blower and Forge Co., Lancaster, Pa.; riveter and smith's forges 2,079
Chicago Pneumatic Tool Co., Los Angeles; rotary air screw drivers, Aircraft Assembly Plant, Fort Worth, Texas 3,400
Chicago, Rock Island and Pacific Railway Co., Chicago; wheel borers, lathes and planers 4,942
Cleveland Pneumatic Tool Co., Cleveland; air drills, Aircraft Assembly Plant, Fort Worth, Texas 4,500
James B. Clow & Sons, Chicago; pipe and fittings, Wright Field, Dayton, Ohio 9,738
Cole Supply Co., Ltd., Tuscaloosa, Ala.; cast iron radiators and fittings, Grimes Advanced Single Engine Flying School, Dothan, Ala. 3,673
Crane Co., Washington; valves and fittings 3,666
Electric Wheel Co., Quincy, Ill.; spare parts for two-wheel trailers 4,407
Florence Pipe Foundry and Machine Co., Philadelphia; fire hydrants, gate valves and boxes, Grimes Advanced Single Engine Flying School, Dothan, Ala. ... 5,262
Four Wheel Drive Auto Co., Clintonville, Wis.; boring machine with spare parts 31,023
Fuchs Machinery & Supply Co., Omaha; machine benches, steel, Aircraft Assembly Plant, Fort Crook, Neb.; 4,292
vacuum cleaners, portable, Aircraft Assembly Plant, Fort Crook, Neb. 4,712
Goulds Pumps, Inc., Seneca Falls, N. Y.; centrifugal pump with spare parts 21,360
Hubbard & Floyd, Inc., New York; centrifugal pumps, Aircraft Assembly Plant, Fort Worth, Texas 6,450
Industrial Equipment Co., Kansas City; casters, Aircraft Assembly Plant, Kansas City, Kan. 3,764
Interstate Machinery & Supply Co., Omaha; oil extractor, centrifugal, Aircraft Assembly Plant, Fort Crook, Neb. 2,887
Jeffrey Mfg. Co., Columbus, Ohio; sludge collectors and controls, Advanced Twin Engine School, Valdosta, Ga. 5,070
Johnson Motors Division of Outboard Marine & Mfg. Co., Waukegan, Ill.; spare parts for outboard motors 2,913
Joliet Wrought Washer Co., Joliet, Ill.; washers, wrought iron ... 2,067
Joyce-Cridland Co., Dayton, Ohio; jacks 3,863
A. Leschen & Sons Rope Co., St. Louis; wire rope and wire rope clips 2,709
Link-Belt Co., Philadelphia; sludge collectors and controls, Advanced Single Engine School, Moultrie, Ga. 3,450
Machinery Sales & Supply Co., Dallas; engine lathe accessories, Aircraft Assembly Plant, Fort Worth, Texas 7,424
McKiernan-Terry Corp., New York; pile drivers 21,694
McMaster Carr Supply Co., Chicago; saws, rail tongs and benders 8,367
winch hoists 4,520
Machinery Sales & Supply Co., Dallas; surface planer with equipment, Aircraft Assembly Plant, Fort Worth, Texas 3,000
Magnaflux Corp., Chicago; inspection unit, Aircraft Assembly Plant, Fort Worth, Texas 2,460
Moore Machinery Co., Los Angeles; power hammers and accessories, Aircraft Assembly Plant, Fort Worth, Texas 2,400
C. Joseph Moyer, Ocean City, N. J.; five launches 102,750
Orleans Material and Equipment Co., Inc., New Orleans; structural steel, Biloxi, Miss., Aviation Mechanics' Training School 5,530
Pioneer Engineering Works, Inc., Minneapolis; rock crusher 19,289
Pressed Steel Car Co., Inc., Pittsburgh; dump cars 43,825
Railroad Products Co., Cincinnati; locomotive water columns 32,789



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Ramapo Ajax, Division American Brake Shoe and Foundry Co., New York; gage rods 83,700
Ransome Concrete Machinery Co., Dunellen, N. J.; mixers 3,343
David Round & Son, Cleveland; jib cranes and chains 4,853
Sidney Machine Tool Co., Sidney, Ohio; lathes 26,599
Sullivan Machinery Co., New York; items for air compressors 348,853
core drills 10,414
James R. Sutton, New Orleans; miscellaneous iron for engine test building, Biloxi, Miss., Aviation Mechanics' Training School 13,971
Union Twist Drill Co., Athol, Mass.; drills 3,348
United States Pipe & Foundry Co., Philadelphia; cast iron pipes and fittings 22,830
U. S. Steel Export Co., Washington; rails, splice bars, and ties. 28,846
steel bars and flats 16,545
Universal Unit Power Shovel Corp., Milwaukee; cranes and attachments 46,161
Watson-Stillman Co., Roselle, N. J.; presses 5,500
Wheeling Steel Corp., Wheeling, W. Va.; steel pipes 13,819
Robert P. White, Athens, Ga.; automatic stokers, Georgia Air Depot, Macon, Ga. 13,670
Woodings - Verona Tool Works, Verona, Pa.; lock nuts, anti-creepers 84,536

War Dept., Quartermaster Corps:

Belknap Hardware Mfg. Co., Louisville, Ky.; component parts for blacksmiths' tool kits $9,525
component parts for carpenters' tool kits 5,817
Chicago Pump Company, Chicago; vacuum pump for boiler room, Kansas City QM Depot 1,544
Chicago Tool & Kit Mfg. Co., Chicago; component parts for blacksmiths' tool kits 838
Corbitt Co., Henderson, N. C.; trucks, 6-ton 787,500
County Supply Co., Plainfield, N. J.; component parts for carpenters' tool kits 827
General Motors Corp., Chevrolet Division, Flint, Mich.; trucks, 1½-ton, cargo and dump 4,570,501
Heller Brothers Co., Newark; component parts for blacksmiths' tool kits 1,010
Illinois Lock Co., Chicago; locks, cylinder type 5,004
Johnson Motors Co., Waukegan, Ill.; motors 3,836
Maclane Hardware Co., New York; anvils 3,208
A. J. Miller Auto Cruiser Trailer Co., Inc., Bradenton, Fla.; van 2-wheel trailers 8,585
Arthur J. O'Leary & Son Co., Chicago; component parts for blacksmiths' tool kits 4,160
Pittsburgh Des Moines Steel Co., Pittsburgh; elevated water tank, Columbus General Depot, Ohio. 27,236
G. L. Prentice Mfg. Co., New Britain, Conn.; belt clips 2,743
Stanley Tools, New Britain, Conn.; component parts for blacksmiths' tool kits 1,867
Earl A. Starrett, Thomaston, Me.; freight and passenger vessel .. 21,500
Stokes Bros. Mfg. Co., Freehold, N. J.; rasps, horseshoeing 786
Union Hardware Co., Torrington, Conn.; chisels 3,817
Vaughan & Bushnell Mfg. Co., Chicago; component parts for carpenters' tool kits 2,019
component parts for blacksmiths' tool kits 722
Welker Mfg. Co., Cromwell, Conn.; belt buckles 26,532

War Dept., Coast Artillery Corps:

General Electric Co., Schenectady; welding sets $2,412
Schmid Brothers, Lancaster, Pa.; firing device cases 2,475

War Dept., Chemical Warfare Service:

Bethlehem Steel Co., Bethlehem, Pa.; tinplate coke $14,637
Crown Can Co. Division of Crown Cork & Seal Co., Inc., Philadelphia; chemical container assemblies & bottoms 98,839

Defense Plant Building:

Allis-Chalmers Mfg. Co., Milwaukee; additional plant at West Allis, Wis., and equipment for mfg. superchargers $9,066,964
American Propeller Corp., Toledo, Ohio; machinery and equipment for mfg. steel propeller blades.. 3,632
American Welding & Mfg. Co., Warren, Ohio; additional plant at Warren, Ohio, and equipment for mfg. tank parts 484,000
Bridgeport Brass Co., Bridgeport, Conn.; expansion of Indianapolis facilities for mfg. cartridge cases 820,000
N. A. Woodworth Co., Ferndale, Mich.; additional facilities for mfg. aircraft engine parts 592,045

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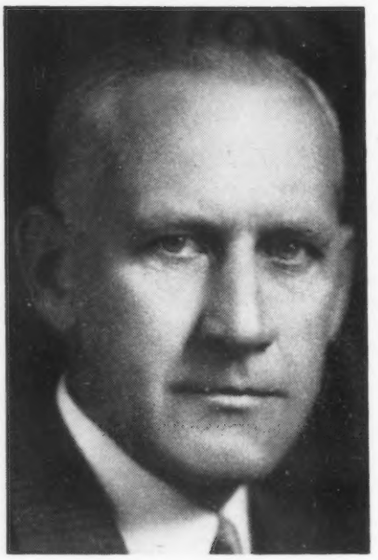
PERSONALS . . .

• **W. C. Sayle,** vice-president and general manager of the Cleveland Punch & Shear Works Co., has been elected to succeed his father, the late Walter D. Sayle, as president of the company. Mr. Sayle became associated with the company in 1908 after attending Cornell University and acquired a practical knowledge of machine shop practice through active participation in the work of the various departments. In 1914, he was appointed to the position of executive vice-president and general manager of the entire organization which position he has held until his election as president.

• **Robert D. Knight,** assistant general foreman in the spring mill at South Works, has been appointed superintendent of the Worcester, Mass., operating department, American Steel & Wire Co., Pittsburgh. Mr. Knight joined the company in 1932, after being graduated from the Massachusetts Institute of Technology. **Harry F. Clarke,** general foreman in the rail bond department of the South Works, has been made assistant superintendent. Mr. Clarke joined the company in 1936, after graduation from Worcester Polytechnic Institute. **George E. Hansen,** formerly general foreman of the spring mill at South Works, has been named product engineer in the metallurgical department.

• **J. T. Hively** has been named director of public relations of the Denison Engineering Co., Columbus, Ohio. Mr. Hively will be in charge of personnel, government priorities, government reports, plant protection, and act as company representative to the selective service boards. Prior to his association with the Denison Engineering Co., Mr. Hively was president of the J. T. Hively Oil Co. of Columbus.

• **Harry L. Bill** has been elected vice-president and general manager of the Greenfield Tap & Die Corp., Greenfield, Mass., to succeed **Howard M. Hubbard,** who resigned recently. Mr. Bill has had experience in both the automotive industry, having been connected with the Corbin Motor Vehicle Co., New Britain, Conn., as factory manager and with the Chalmers Motor Co., and the aircraft industry, having joined the Bendix Aircraft Corp. in 1935 as vice-president and general manager of their subsidiary, the Pioneer Instrument Co., Brooklyn. Before going to Greenfield, Mr. Bill managed United Aircraft Products, Inc., of Dayton, Ohio, where he was president and general manager until his resignation to join Greenfield.



HARRY L. BILL, vice-president and general manager of the Greenfield Tap & Die Corp., Greenfield, Mass.

W. C. SAYLE, president, Cleveland Punch & Shear Works Co., Cleveland.

• **Thomas A. Jordan** has been appointed assistant division engineer, Western division, of the American Bridge Co., Pittsburgh, succeeding **F. W. Dencer** who is retiring after 40 years of continuous service. Mr. Jordan began his service with the bridge company in 1910 as a draftsman at the old Lassig plant in Chicago. Nine years later he was transferred to the Chicago office where he served as designer until 1930. He was made assistant engineer in charge of design at that time and remained in that capacity until receiving his present appointment. Mr. Dencer's employment with the American Bridge Co. started in the Chicago office in 1901 as a draftsman, a position he held until being appointed engineer for the old Lassig and American plants in 1903. In 1911 he was transferred to the Gary plant as engineer and remained in that capacity until 1930 when he became assistant division engineer.

• **Norman P. Goss,** former metals researcher for the Cold Metal Process Co., has been appointed research engineer of American Steel & Wire Co., Cleveland, subsidiary of U. S. Steel Corp. Mr. Goss has been engaged in metal research since 1925 and holds a number of patents on strip steels such as light gage high strength tin plate and low alloy high strength strip steels.

• **Reginald B. Taylor** has resigned as vice-president of the Niagara Share Corp., Buffalo, to become vice-president and assistant treasurer of the Sterling Engine Co., also of Buffalo. Mr. Taylor will head a newly-created priorities division of the company to help expedite priority materials needed for production of marine motors for the government.

• **George R. Auld,** superintendent of the Frigidaire ordnance plant, has been named works manager at the Aeroproducts division at Vandalia. He will supervise produc-

tion of airplane propellers. **W. E. Kreitzer,** who has been in charge of the material control division of the Frigidaire ordnance plant, will become manager of purchasing and material control at Aeroproducts. Succeeding Mr. Auld as general superintendent of the Frigidaire ordnance plant is **Carl N. Bogan,** formerly assistant superintendent in charge of processing, maintenance and tools at the Moraine plant. **J. C. Pennington,** a long-time Frigidaire employee, has been made superintendent in charge of ordnance plant processing, maintenance and tools. **Theodore L. Pantz,** another longtime Frigidaire employee, was promoted to the post of superintendent in charge of processing, maintenance and tools in the Moraine City plant.

Named superintendent of Frigidaire's propeller parts plant which is now being built at Moraine City was **L. G. Hahn,** formerly assistant superintendent of production in the Morain refrigerator plant. **E. H. Allen,** formerly supervisor of unit machines at the Frigidaire Moraine City plant, was advanced to the post of superintendent of production of the new Frigidaire propeller parts plant. **H. K. Bentz,** supervisor of manufacturing processes at the Frigidaire No. 1 plant, was made superintendent of processing, maintenance and tools at that plant. **G. W. Hughes,** senior foreman in the tool design department at Frigidaire plant No. 1, is now tool supervisor for the new propeller production unit. **H. A. Klepinger,** formerly in the inspection division of the Moraine City refrigerator plant, was made chief inspector of the Frigidaire propeller plant.

• **James W. Parker,** vice-president and chief engineer of the Detroit Edison Co., was elected by a letter ballot of the 15,000 members of the American Society of Mechanical Engineers to be president of the Society during 1942. Vice-Presidents elected at the same time to serve two-year terms on the council of the A.S.M.E. were **Clarke F. Freeman,** senior vice-president and engineer of the Manufacturers Mutual Fire Insurance Co. and its associated companies, Providence, R. I.; **C. B. Peck,** managing editor of *Railway Mechanical Engineer,* New York; **W. H. Winterrowd,** vice-president of the Baldwin Locomotive Works, Eddystone, Pa., and **W. R. Woolrich,** dean of the College of Engineering, and director of the Bureau of Engineering Research of the University of Texas, Austin, Tex.

• **R. H. Musser,** for the last four years assistant district sales manager of the Chicago office of the Heppenstall Co. has been appointed manager of the priorities department of the company with headquarters in Pittsburgh.

• **George L. Hubbell** has been appointed sales engineer for the Midwestern territory of the Porcelain Enamel & Mfg. Co. of Baltimore, Md. Mr. Hubbell has had wide experience, having formerly been district sales manager for the Globe Wernicke Co., production manager and Southeastern sales manager for the E. F. Hauserman Co., manufacturers of steel products, and recently having been connected with the Home Owners' Loan Corp., Washington.

• **David P. Harr,** manufacturer's representative with offices in the General Motors Building, Detroit, has entered the Quartermaster's Corps of the United States Army and has reported for duty in Washington where he will serve under Col. Douglas Dow, of Detroit. His title is senior production engineer, a civilian job which he filled also in the World War. Mr. Harr formerly was head of the General Motors exhibit at the San Francisco Exposition.

• **Harry R. Fruehauf,** vice-president of Fruehauf Trailer Co., has been named first vice-president in one of a series of promotions just announced by **Harvey C. Fruehauf,** president. Others named are **Roy A. Fruehauf,** vice-president to vice-president in charge of operations; **L. C. Allman,** vice-president to member of executive committee; **A. L. Struble,** general sales manager to vice-president and director of sales; **Robert Kirksey,** vice-president and general manager of Fruehauf Trailer Co. of California to vice-president of Fruehauf Trailer Co.; **Roy Warren,** purchasing agent to director of purchases, and **John Votypka,** chief engineer, to director of engineering.

• **Edwin A. Wert** has been named vice-president in charge of engineering and sales of the power piping division, Blaw-Knox Co., Pittsburgh. The new divisional executive, taking the position held until recently by **S. J. Horrell,** has been a consultant for the company for a number of years and was formerly connected with the Detroit Edison Co., where he had been engaged in an engineering and design capacity for 18 years.

Mr. Wert is an alumnus of the University of California and was an instructor in the U. S. Air Corps during the last war. He is also the inventor of the Blaw-Knox functional spring hangers and vibration eliminators for high pressure-high temperature piping systems.

• **Frank E. Watts,** formerly chief engineer of the old Hupp Motor Co. is a special designer of tanks and other combat vehicles at the Aberdeen Proving Grounds, Md.

• **Edward P. Kellie** has been named a vice-president of the American Injector Co., Detroit. He is also acting as chief engineer and sales manager.

• **Paul S. Strecker,** personnel director of the Grand Rapids stamping division of General Motors Corp., Detroit, was elected general chairman of the automotive section of the National Safety Council, at the annual meeting of the Council in Chicago, Oct. 6 to 10. Mr. Strecker was educated at Ohio Wesleyan and Purdue Universities and served as an ensign in the United States Navy during the last war, following which he entered the teaching profession as an instructor in machine shop practice at the Grand Rapids public schools. He joined General Motors in 1929 as an instructor at the General Motors Institute in Flint and assumed his present position as director of all personnel and safety work at the Grand Rapids stamping plant in March, 1936, at the time when that plant was put into operation.

• **Earl C. Maund** has been appointed to the sales and engineering staff of the Chicago office of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. Mr. Maund's engineering services will cover the products of Consolidated safety valves, Hancock valves, American Instruments and Ashcroft gages. Mr. Maund was formerly in an engineering capacity with the Sinclair Refining Co., at East Chicago, Ind., and with Cities Service at Shreveport.

• **C. C. Clark** has been appointed sales manager, Western district, for Pressed Steel Car Co., Inc. His headquarters are at 122 South Michigan Avenue, Chicago.

• **Campbell Wood,** Nash-Kelvinator Corp. executive since shortly after the armistice of the last war, has been named general manager of the Nash-Kelvinator national defense plant at Lansing, Mich. He will move his office to Lansing from Washington. Co-executives will be **E. F. Keller,** factory manager of the two plants at Lansing and **D. E. Ball,** production manager for both plants. Other company executives recently named to the Lansing plant include: **B. A. Chapman,** plant engineer; **D. G. Ellis,** purchasing agent, and **Joe Slachta,** master mechanic. Mr. Keller goes to Lansing from Kenosha, Wis., and at one time was with Reo Motor Car Co. whose plants are now being used by Nash. Mr. Slachta formerly worked for Reo also.

• **Harlan H. Newell** has been elected treasurer and member of the board of directors of the Cleveland Automatic Machine Co., Cleveland. Mr. Newell served with the U. S. Navy during World War I, subsequently being associated with the Standard Welding Co., Arthur G. McKee & Co., and Harris, Forbes & Co., before joining the staff of the Society for Savings in 1925, where he has since been employed, serving as vice-president since 1927.

• **C. A. Johnson** has been appointed general manager of sales, fabricated steel construction, Bethlehem Steel Co., Bethlehem, Pa., succeeding **C. M. Denise,** who has resigned because of continued ill health. Mr. Johnson began his career with the Worden-Allen Co. of Milwaukee, and later was transferred to Lackawanna Bridge Co., Buffalo, a subsidiary of Worden-Allen, which subsequently was acquired by Lackawanna Steel Co. Following Bethlehem Steel Co.'s acquisition of Lackawanna, Mr. Johnson was appointed manager of Bethlehem's fabricated steel sales and has continued as manager to the present time, now becoming general manager.

• **John A. O'Brien** has been elected to the post of vice-president of Johns-Manville Sales Corp., New York. Mr. O'Brien will continue his duties as general sales manager of the power products and industrial department, a post he has held since 1938. He is a member of the J-M Quarter Century Club, having begun his career with the company in 1915.

• **Warren C. Hutchins** has been appointed manager of sales of the General Electric special products section of the industrial department, Schenectady, succeeding **Dr. H. A. Jones,** now in charge of sales of non-radio electronic tubes. Mr. Hutchins joined the General Electric Co. in 1928, the same year that he was graduated from Clemson College, at the Lynn River Works, transferring the following year to the design engineering department. He had been assigned to arc welding and resistance welding sales work in Schenectady and has held positions in the special products and machinery manufacturers sections before his present appointment.

• **Thomas Toby,** New York sales representative of the Pittsburgh Screw & Bolt Corp., Pittsburgh, has been appointed Eastern district manager of sales with headquarters in the International Building, 630 Fifth Avenue, New York.

• **Charles R. Pollock** has been appointed by the Sentry Co., Foxboro, Mass., to serve as their district manager for the Detroit and Toledo areas. Mr. Pollock will maintain offices at 7450 Melville Avenue, Detroit. **Charles R. Bringman,** 310 East Orlando Avenue, Orlando, Fla., will be in charge of the Florida office.

• **A. W. Thomas,** who joined the Chain Belt Co., Milwaukee, in 1927, has been made sales manager of the construction machinery division. **D. A. Kalton** who has been promoted to assistant sales manager of the construction machinery division, joined Chain Belt after being graduated from Marquette University in 1932 and has held successively the positions of field salesman, Eastern district manager and assistant to the sales manager. **A. J. Frank** has been appointed assistant to the manager of the division. Mr. Frank became associated with the Chain Belt Co. as a student apprentice one year after his graduation from Yale University. He later served in various capacities in divisional staff work and was appointed sales promotion manager of the division in 1939.

• **Fred R. Cooper,** formerly of Chrysler Corp., has been named assistant to **Joseph W. Frazer,** president of Willys-Overland Motors, Inc., at Toledo.

• **H. E. Graham,** for 10 years assistant to the president and traffic manager of Jones & Laughlin Steel Corp., Pittsburgh, will retire Nov. 1. Mr. Graham went to Jones & Laughlin from the American Car & Foundry Co., where he had been associated for about 15 years.

• **William A. Thompson,** vice-president and secretary of the Allis-Chalmers Mfg. Co., Milwaukee, has resigned, having reached the age of 65. No successor will be appointed, his work being distributed among other employees. He joined the firm in 1901 as an accountant at the general offices which were at that time in Chicago. He went to Milwaukee when the offices were moved there in 1906 and a year later was appointed comptroller, a position he held until 1932 when he was named to the office he is now relinquishing.

• **H. E. Curll,** formerly chief engineer of the Philadelphia Drying Machinery Co., and more recently vice-president, treasurer and chief engineer of Stoler & Curll, Inc., has been named president and treasurer of the Vulcan Corp., Philadelphia, which is the new firm name for Stoler & Curll, Inc. **A. H. Kruger,** recent sales manager of R. S. Products Co., has been appointed vice-president, secretary and sales manager of the company. **B. G. Tarkington** will be chief engineer.

• **Charles J. Slunder** has been named to the research staff of Battelle Memorial Institute, Columbus, Ohio, having been assigned to the Institute's division of electrochemical research. A graduate of Massachusetts Institute of Technology in electrochemical engineering, Mr. Slunder has had 15 years of experience in the field of industrial electrochemistry. Prior to joining the Battelle staff he was with the Aluminum Company of America and earlier held positions with the United States Rubber Co., Packard Motor Co., and Dodge

Brothers, division of Chrysler Corp.

• **R. H. McCormick** has been put in charge of all advertising and sales promotion of the Vascoloy-Ramet Corp., North Chicago.

• **H. G. Hilton,** vice-president of the Steel Co. of Canada, Ltd., has been elected a director. Mr. Hilton is a graduate of the Case School of Applied Science and before his association with the Steel Company of Canada was connected with the blast furnace operations of Pickands Mather & Co. He went to the Steel Company of Canada, Ltd., in 1919 as blast furnace superintendent, became assistant works manager in 1927 and in 1934 was made works manager. Mr. Hilton was appointed vice-president in 1937 and his appointment to the board of directors of the Steel Co. of Canada, Ltd., fills the vacancy left by The Right Hon. Arthur B. Purvis, who, until his recent death in an airplane accident in England, was chairman of the British Purchasing Commission.

• **Robert C. Ellsworth** has been named to represent the Osborn Mfg. Co., Cleveland, in Southern California, Arizona, Colorado and New Mexico. Western Connecticut and Rhode Island are being covered by **James G. Gammel. William T. Glendinning** is the new representative in Northern and Western Michigan, while **G. Edward Mehleck** is promoting Osborn sales in Arkansas, Louisiana, Mississippi and Western Tennessee.

• **Harry B. Royer** has been named vice-president and general superintendent of the South Buffalo Railway to succeed the late J. W. St. Clair. The railroad, controlled by the Bethlehem Steel Company, serves the company's Lackawanna plant. Mr. Royer formerly was vice-president and general manager of the Cornwall Railway Co. of Lebanon, Pa.

• **Dr. Horace H. Bliss,** formerly of Bundy Tubing Co., Detroit, for five years, has become senior chemist in the aircraft division of Murray Corp. of America, Detroit.

• **Maurice N. Landis** has been appointed manager of the metallurgical and research division of the La Salle Steel Co., Chicago. He has served as chief metallurgist for the company for 10 years and previously he served as plant superintendent. **Henry N. Landis** has been named assistant manager of metallurgical engineering under H. E. Mack, vice-president in charge of metallurgical engineering, and **A. Frank Golick** has been appointed assistant general manager of sales under T. L. Kelly, executive vice-president in charge of sales. Mr. Golick was formerly a special sales representative for the company and has been associated with the steel industry in metallurgical and sales capacities for over 20 years.

• **J. E. Johnson** has resigned as vice-president of the Muskegon Piston Ring Co., Muskegon, Mich., and as manager of its Muskegon plant but will continue as a member of the board of directors. He will devote his time to the affairs of Air Control Products, Inc., Muskegon, of which he is treasurer and a director.

OBITUARY...

• **Thomas H. McCormick,** associated with his father in the operation of the Eastern Pattern Works, Detroit, died recently.

• **Emery E. Davis,** inventor of the Davis expansion boring tool and the Davis expansion reamer, and former president of the Davis Boring Tool Co., St. Louis, which went into receivership in 1927, died in St. Louis aged 67 years. He founded the tool company in 1905.

• **Frank J. Barnhardt,** head of the Barnhardt Sheet Metal Works, Cudahy, Wis., died in a Burlington, Wis., hospital following a collapse while driving his automobile on Sept. 28. He was 52 years old.

• **Harry de Lisle,** president of the Engineering Sales Co., Sheboygan, Wis., and **Herbert W. Hainsfurther,** district manager of the Formica Co., at Chicago, were drowned when swept off a schooner in a storm near the entrance to the Sheboygan harbor. Stewart P. Walsh of Milwaukee, Wisconsin, Formica representative, was rescued.

• **Frederick J. Leach,** research engineer in the engineering department of American Steel & Wire Co., died Oct. 14. Mr. Leach had a varied business career, ranging from editor of the Lyons *Republican* and prospecting in the Klondike to the office of secretary and treasurer of a company promoting an electrical typewriter. He also was employed as foreman of tool cribs by the Curtiss Aeroplane Co. and for Symington-Anderson Co., an ordnance plant, before becoming associated with American Steel & Wire Co. in 1928. He was 67 years old.

• **A. G. Montgomery,** assistant chief engineer, American Steel & Wire Co., Cleveland, died Oct. 10, aged 54 years. Mr. Montgomery held a variety of engineering positions with American Steel & Wire Co., in Pittsburgh and Cleveland, since 1914.

• **Albert Temple Potter,** an employee of E. C. Atkins & Co., Indianapolis, for 51 years and for many years manager of purchases and supplies for that company, died Sept. 28, aged 76 years. Mr. Potter began an association with the Atkins firm in 1890 which continued until his death.

• **Lee Roy Kells,** sales engineer for the Wellman Engineering Co., died suddenly at his home in Cleveland Heights on Oct. 4. After graduating from Ohio State University, Mr. Kells went with the Pennsylvania Railroad, then with the Chapman Stein Co. of Mt. Vernon, Ohio, being chief engineer when absorbed by Surface Combustion Co. He was with Surface Combustion for four years, later going with the Salem Engineering Co., holding the position of sales engineer and later chief engineer, until becoming associated with the Wellman Engineering Co. in October, 1940. He was 51 years old.

• **Armand J. Ladeuceur,** treasurer of the Michigan Malleable Iron Co., died Oct. 11 in a Bath (N. Y.) hospital of injuries received in an automobile accident near that city. Mr. Ladeuceur, 57 years old, lived in Detroit, having been a resident of that city since 1909. He was born in Amherstburg, Ont.

CONSTRUCTION STEEL

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Awards advance to 25,500 tons from 23,900 tons last week; new projects of 32,500 tons compare with 12,800 tons a week ago; plate awards only 200 tons.

NORTH ATLANTIC STATES AWARDS

5000 Tons, Weymouth, Mass., lighter than air base, to Harris Structural Steel Co., Plainfield, N. J.

3700 Tons, Niagara Falls, N. Y., extension to Belle Aircraft Co., to Bethlehem Steel Co., Bethlehem, Pa.

1800 Tons, New York, Nightingale Cancer Hospital, to Harris Structural Steel Co., Plainfield, N. J.

290 Tons, Syracuse, N. Y., boiler house extension for Solvay Process Co., to American Bridge Co., Pittsburgh.

220 Tons, Pittsburgh, repairs to bridge No. 1-C, Banksville Avenue, to American Bridge Co., Pittsburgh.

200 Tons, Steuben County, N. Y., highway bridge, to Bethlehem Steel Co., Lackawanna, N. Y., through Howes & Farrell Co., contractor, Oneida, N. Y.

170 Tons, Linden, N. J., Lawrence Engineering plant, to Elizabeth Iron Works, Elizabeth, N. J.

125 Tons, Trenton, N. J., renewal bridge No. 53.47, Colemans Road, for Pennsylvania Railroad Co., to American Bridge Co., Pittsburgh.

105 Tons, Charleroi, Pa., factory building for Corning Glass Co., to an unnamed fabricator, through H. K. Ferguson Co., contractor.

THE SOUTH

3600 Tons, Bauxite, Ark., superstructure and pot shells for Aluminum Co. of America, to Chicago Bridge & Iron Co., Chicago.

1300 Tons, Carrollton, Ky., Kentucky River State bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

CENTRAL STATES

2300 Tons, Venice, Ill., Union Electric Co. power plant, to an unnamed fabricator, through Stone & Webster Engineering Corp., Boston, contractor.

350 Tons, Ullin, Ill., bridge No. 344-82 for Illinois Central System, to American Bridge Co., Pittsburgh.

WESTERN STATES

3500 Tons, Bonneville, Ore., transmission towers for Bonneville-Vancouver line No. 5, to Bethlehem Steel Co., San Francisco.

1575 Tons, Los Angeles, Phelps-Dodge Copper Products Corp. tube mill, to Bethlehem Steel Co., Los Angeles.

1000 Tons, Burbank, Cal., Lockheed flight operations hangar, to Consolidated Steel Corp., Los Angeles.

260 Tons, Santa Margarita, Cal., drum gate for Army, to American Bridge Co., Pittsburgh.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

2000 Tons, Erie, Pa., General Electric Co. turbine shop; bids in.

1500 Tons, Tonawanda Township, N. Y., airplane motors testing building for Chevrolet Motor Division, G.M.C.; John W. Cowper Co., Inc., low bidder on general contract.

280 Tons, New York, dumping board, Marginal and E. 32nd Streets, for city.

240 Tons, Mellville, R. I., storehouse Navy fuel depot.

115 Tons, Philadelphia, catapult test building for Navy.

100 Tons, Hingham, Mass., government storage building.

THE SOUTH

2800 Tons, Louisville, Ky., plant for Defense Plant Corp.

CENTRAL STATES

560 Tons, Cincinnati, store building for J. C. Penny Co.

340 Tons, East Chicago, Ind., plant addition for Continental Roll & Steel Foundry Co.

195 Tons, Unnamed location, steel bridge caps for Northern Pacific Railway.

190 Tons, Chicago, belt railway subway, W. 47th Street.

180 Tons, Lincolnwood, Ill., bridge over North Shore Channel.

120 Tons, Appleton, Wis., machine building for Institute of Paper Chemistry.

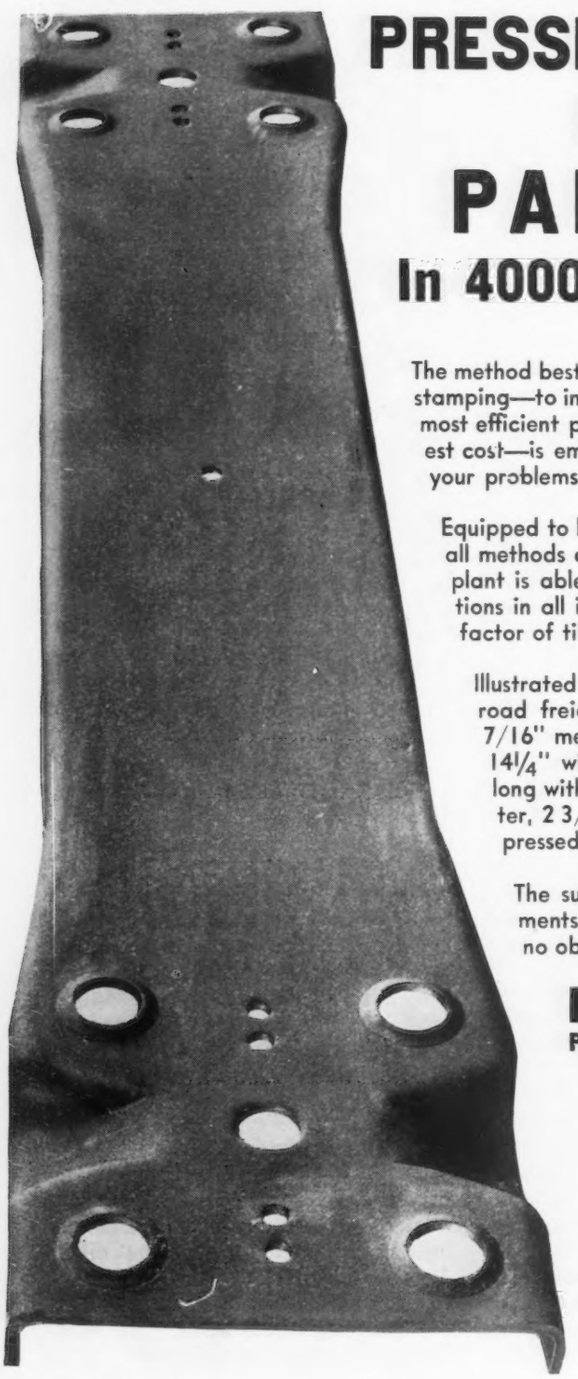
WESTERN STATES

10,000 to 30,000 Tons, Las Vegas, Nev., Basic Refractories Corp., magnesium plants; McNeil Construction Co., Los Angeles, contractor.

2000 to 3000 Tons, Los Angeles, Bohn Aluminum & Brass Co. plant.

1600 Tons, Coram, Cal., trash racks for Shasta Dam (Specification 1004); bids Nov. 4.

300 to 500 Tons, Torrance, Cal., National Supply Co. plant building.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

PARISH *Specialists in* STAMPINGS *of Distinction*

108 Tons, Keyport, Wash., exploder building at torpedo station (Schedule 1332-A); bids in.

FABRICATED PLATES

AWARDS

200 Tons, Boston, Metropolitan District, 24-in. pipe line, to Holyoke Steam Boiler Works, Holyoke, Mass.

PENDING PROJECTS

2500 Tons, Riverside, Cal., 20-in. steel pipe line from Lake Mathews to Camp Haan; bids taken Oct. 21.

Pipe Lines

Metropolitan District Board of Contract and Supply, Municipal Building, 550 Main Street, Hartford, Conn., asks bids until Oct. 27 for about seven miles of 37½-in. electric-welded steel pipe, double-dipped in asphalt enamel, from junction of present Nepaug pipe line, near village of Collinsville, Conn., to terminus of existing Nepaug conduit near town of Farmington, to be known as Nepaug pipe line No. 2. Alternate bids will be considered for 36-in. reinforced-concrete cylinder pipe. Plans at office of chief engineer of Water Bureau of District, 1026 Main Street, Hartford.

Construction Quartermaster, Quartermaster Depot, Charlotte, N. C., asks bids until Oct. 31 for installation of underground pipe line for oil transmission at local depot.

Gulf Refining Co., Gulf Building, Pittsburgh, plans steel pipe lines, including gathering system, in connection with development of crude oil properties in oil field district of Osceola County, Mich. Steel tank storage facilities will be installed. New wells will be drilled.

Bureau of Reclamation, Denver, closes bids Oct. 27 for eight 102-in. welded steel conduit units for temporary service in river outlets at Shasta dam, Kennett Division, Central Valley project, Cal. (Specification 1574-D).

Southern California Gas Co., 810 South Flower Street, Los Angeles, has let contract to Macco-Robertson Co., 815 Paramount Boulevard, Clearwater, Cal., for 18-in. welded steel pipe line from foot of ridge at Grapevine to connection with main pipe line from Rio Bravo, Ten Sections and Paloma gas field areas, about 16 miles, for natural gas transmission. Cost about $400,000.

Fourth Naval District, Navy Yard, Philadelphia, has low bid from Bowers Brothers Co., 2015 Sansom Street, Philadelphia, at $148,000, for pipe line system for gasoline distribution at station at Cape May, N. J.

Cast Iron Pipe

Hawkins, Tex., plans pipe lines for water system and other waterworks installation. Cost about $58,700. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Galveston County Water Control and Improvement District No. 31, Galveston, Tex., plans water pipe line system and other waterworks installation. Cost about $140,000, of which $70,000 will represent a Federal grant.

Knox Water & Light Co., Knox, Ind., plans pipe line extensions and improvements in water system; also elevated steel tank and tower, and pumping station. Cost close to $37,500.

Paso Robles, Cal., plans pipe line extensions and improvements in water system. Cost about $42,300 including other waterworks facilities. Financing has been arranged through Federal aid.

Weekly Bookings of Construction Steel

Week Ended →	Oct. 21, 1941	Oct. 14, 1941	Sept. 23, 1941	Oct. 22, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	25,500	23,900	32,900	39,050	1,109,195	913,886
Fabricated plate awards	200	0	5,825	900	105,625	123,570
Sheet steel piling awards	0	0	4,500	2,735	25,260	63,570
Reinforcing bar awards	13,250	13,850	16,700	14,100	622,630	388,360
Total letting of Construction Steel	38,950	37,750	59,925	56,785	1,862,710	1,489,386

East Woodland Public Water District, near Puyallup, Pierce County, Wash., care of Parker & Hill, Smith Tower Building, Seattle, engineers, plans pipe lines for water system. Cost about $130,000, of which about $70,000 will be secured through Federal aid.

7 lifting advantages

In SHAW-BOX ELECTRIC HOISTS are seven features which mean speed, efficiency and economy in lifting.

They are the results of many years' engineering and represent the most modern thought in hoists.

Here they are:

1 — "One-point" Lubrication
2 — Interchangeable Suspension
3 — "Fool-proof" Upper Stop
4 — Two-gear Reduction Drive
5 — Hyatt Roller Bearings
6 — Enclosed Construction
7 — Ball Bearing Motor

No other electric hoist has all these saving features yet you pay no price premium for them. Specify "Shaw-Box" electric hoists for your hoists and let this superb lifting mechanism go to work for you.

There are sizes for all jobs — for yours. They come in lifting capacities from 250 pounds to 20 tons in combinations and arrangements to fit every demand of industry for hoists.

Thousands of installations throughout the country testify to the reliability and working efficiency of SHAW-BOX electric hoists.

Send for catalog with completely illustrated information. It will show you how to lift more — quicker — for less.

Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send all your Crane and Hoist inquiries to Shaw-Box!

SHAW-BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
MUSKEGON · · MICHIGAN

Reinforcing Steel

Awards of 13,250 tons; 17,435 tons in new projects.

AWARDS

ATLANTIC STATES

2200 Tons, Suitland, Md., Federal office building, to Bethlehem Steel Co., Bethlehem, Pa.; McCloskey & Co., contractors.

1400 Tons, Brooklyn Navy Yard, drydock, to Jones & Laughlin Steel Corp., Pittsburgh; Contractors for Drydocks, Inc., contractor.

600 Tons, Rockaway, N. Y., modernization of Fort Tilden, to Igoe Brothers, Newark, N. J.; Johnson, Drake & Piper, Inc., Freeport, N. Y., contractor.

500 Tons, Boston, United States Engineers' harbor defense projects, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.

400 Tons, Bristol, Conn., New Departure Division expansion, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

150 Tons, Staten Island, N. Y., Gulf Oil Co. drum storage, to Jones & Laughlin Steel Corp., Pittsburgh; Wortmann & Sons, contractors.

135 Tons bars and mesh, Branford, Conn., State highway, to American Steel & Wire Co., Worcester, Mass.

125 Tons, State of Pennsylvania, State highway, route 223, section 3, to Truscon Steel Co., Youngstown.

THE SOUTH

3500 Tons, Oklahoma City, Okla., Midwest Air Depot, to Sheffield Steel Corp., Kansas City, Mo.

600 Tons, Fayette County, Ky., bridge substructure over Kentucky River, to Laclede Steel Co.; Massman Construction Co., contractor.

125 Tons, Dowan, Tenn., for Cumberland Portland Cement Co., to Truscon Steel Co., Youngstown, through Rust Engineering Co.

119 Tons, Fort Knox, Ky., structure for Army, to Truscon Steel Co., Youngstown.

105 Tons, Tampa, Fla., shipway No. 3 for Tampa Shipbuilding Co. to Truscon Steel Co., Youngstown.

CENTRAL STATES

1000 Tons, Baxter Springs, Kan., Jayhawk ordnance plant, to Sheffield Steel Corp., Kansas City, Mo.

520 Tons, Neosho, Mo., Army cantonment, to Laclede Steel Co.; G. L. Tarleton-MacDonald Engineering Co., contractor.

300 Tons, Cincinnati, highway project No. 196, to Pollak Steel Co., Cincinnati; Visintine Co., contractor.

151 Tons, Carbondale, Ill., for Dept. of Agriculture, to Truscon Steel Co.

115 Tons, West Salem, Ohio, highway project No. 195, to Pollak Steel Co., Cincinnati; A. J. Baltes, contractor.

100 Tons, Columbus, Ohio, Clark Grave Vault Co., to Joseph T. Ryerson & Son; Leo E. Ruisinger, contractor.

WESTERN STATES

350 Tons, Ogden, Utah, Union Pacific Railroad, to Sheffield Steel Corp., Kansas City, Mo.; through Gate City Iron Works.

108 Tons, San Diego, Cal., Naval training base, to Truscon Steel Co., Los Angeles.

100 Tons, Blaine County, Mont., bridge, to Colorado Fuel & Iron Co., Denver.

100 Tons, Fergus County, Mont., viaduct, to Colorado Fuel & Iron Co., Denver.

REPUBLIC OF PANAMA

435 Tons, Public Roads Administration, Invitation E-2-390, to Jones & Laughlin Steel Corp., Pittsburgh.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

2400 Tons, Brooklyn, 26th Ward sewage plant.

2000 Tons, Philadelphia, Philadelphia Electric Co. plant.

1900 Tons, Brooklyn Navy Yard dock walls.

1200 Tons, Brooklyn Navy Yard crane track supports.

500 Tons, Boston, seacoast defense, gun placement.

450 Tons, bars and mesh, New London, Conn., William Street bridge.

250 Tons, Tonawanda, N. Y., Chevrolet Motor Co. plant.

125 Tons, bars and mesh, Berlin, Conn., State road.

THE SOUTH

850 Tons, Fort Kiptopeke, Va., Fort Winslow 16-in. gun emplacement.

850 Tons, Fort Kiptopeke, Va., Fort Storey 16-in. emplacement.

CENTRAL STATES

400 Tons, Wichita, Kan., addition to Boeing Aircraft plant.

250 Tons, Weldon Springs, Mo., addition to ordnance plant.

140 Tons, Oaklawn, Ill., Stickney Community High School.

206 Tons, Cleveland, Bulkley Boulevard project No. 229, State Highway Department; National Engineering & Contracting Co., low bidder.

WESTERN STATES

4161 Tons, Odair, Wash., Grand Coulee power plant (Invitation D-38,133-A); bids Oct. 28.

1000 Tons, Keswick, Cal., Keswick Dam, (Invitation A-33.422-A-1); bids Oct. 24.

350 Tons, Portland, Ore., Bonneville Administration, (Invitation 2292); bids in.

250 Tons, San Francisco, United States Engineer list; bids in.

150 Tons, Odair, Wash., Grand Coulee power plant, (Invitation D-38,139-A); bids Oct. 28.

GUSHER COOLANT PUMP

Every Tool Engineer Recognizes

Every tool engineer recognizes the coolant pump as an important part of his tooling-up plans.

Many tool engineers prefer Ruthman Gusher Coolant Pumps because these pumps need no priming and are ready to deliver the desired volume at the snap of the switch. There are no packings to fuss with, and grit cannot clog the Gusher impeller Coolant Pump. That means there will be no interruption in production so far as coolant supply is concerned.

The RUTHMAN Machinery Company

1821 READING ROAD, CINCINNATI, OHIO, U. S. A.

9 Months' Construction Greatest in 12 Years

• • • **Construction contracts** awarded in 37 eastern states during the first nine months of 1941 amounted to $4,510,879,000 according to F. W. Dodge Corp., while in the comparable period of 1940 award volume was $2,784,352,000. Not since 1929 has construction volume exceeded four and a half billion dollars during the first nine months of the year. In the first three quarters of 1941, nonresidential building expanded to $1,682,166,000—more than double the volume in the corresponding period of 1940. Building and engineering contract awards during September, 1941, totaled $623,292,000, declining somewhat from the record level of August, 1941, but 79 per cent larger than September, 1940.

ARMCO Issues Calculator For Coatings Weights

• • • **A new calculator** for determining the weight of porcelain enamel coatings was recently issued by the American Rolling Mill Co., Middletown, Ohio.

Contracts Awarded for 18 Additional Shipways

Washington

• • • **The Maritime Commission** last week announced contracts made with five shipyards for the construction of 18 additional shipways and two outfitting piers as follows:

Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., eight ways; Louisiana Shipyards, Inc., New Orleans, two ways; Richmond Shipbuilding Corp., Richmond, Cal., three ways; South Portland Shipbuilding Corp., South Portland, Me., two ways and two outfitting piers; Ingalls Shipbuilding Corp., Pascagoula, Miss., three ways. The ways are part of the Commission's emergency and defense aid expansion programs, which provide for the addition of 131 ways to those existent the first of this year in United States shipyards.

↓ ↓

Cleveland

• • • **The Maritime Commission** has awarded contracts for 16 new ore boats as follows: 10 ships will be built by the Great Lakes Engineering Works, 6 at Detroit and 4 at Ashtabula, Ohio; 6 ships will be built by the American Shipbuilding Co., 4 at Lorain and 2 at Cleveland.

Du Pont Will Erect New Michigan Plant

Detroit

• • • **A new plant** for the manufacture of chlorinated hydro-carbon solvents will be erected at Wyandotte, Mich., by E. I. du Pont de Nemours & Co. Construction will begin about Nov. 1 on a 23-acre river-front site. The plant will be a unit of du Pont's R. and H. Chemicals Department. It is expected to be ready in the summer of 1942 and to supplement the production of a du Pont plant at Niagara Falls, N. Y.

A.C.F. Gets New Order For 1200 Light Tanks

• • • **Charles J. Hardy**, president, American Car & Foundry Co., announces receipt of additional order from the government for 1200 12½-ton light combat tanks, amounting to approximately $31,000,000, part of which order includes spare parts and repair parts. Three-fourths of this order will use gasoline engines; one-fourth will be diesel equipped. The company's total orders for these light combat tanks now amount to 5,885 of which almost 2,000 have been delivered.

Washer Firms Get Contracts

• • • **Three companies** in the household washer and ironer industry on Tuesday were given contracts totaling $12,000,000 for .50-cal. anti-aircraft gun mounts. They are the Nineteen Hundred Corp., St. Joseph, Mich.; Apex Electric Mfg. Corp., Cleveland; Easy Washing Machine Corp., Syracuse.

ONE TRAILER-TRUCK FOR ONE MICHIANA CAST ASSEMBLY

You may not need a trailer-truck to deliver just one unit as pictured above, but regardless of size, MICHIANA Alloy Castings insure maximum heat-hours, fewer delays and greater over-all efficiency wherever heat-resistant alloys are required in your production.

MICHIANA has had over 23 years of specialized experience in this one field,—experience that is at your service at all times . . . MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.

MP CORP.

Heat-Resistant and Stainless Steel Alloy Castings:

Carburizing Baskets, Grates, Grids, Retorts, Boxes, Muffles, Tubes, Rolls, Sprockets, Chains, Roller Hearth Castings, Rails

MICHIANA Heat-Resistant and Stainless Steel ALLOY CASTINGS

MACHINE TOOLS

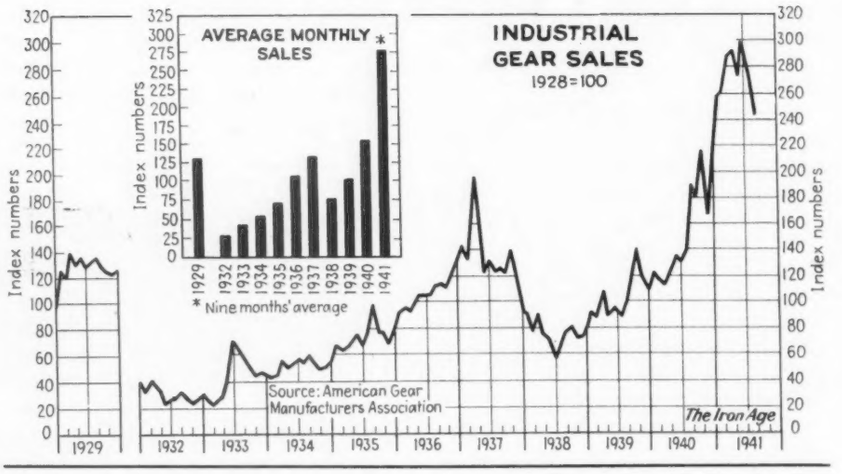
. . . SALES, INQUIRIES AND MARKET NEWS

OPM Seeks to Broaden Subcontracting Base

Cincinnati

• • • **Broadening of the** sub-contracting base is being accelerated by the local O.P.M. office to assist non-defense plants in maintaining operations and to relieve pressure on district machine tool plants. Aside from the effort to prevent dislocation of labor, this is becoming daily necessary because of the steady flow of new orders to district machine tool plants. Manufacturers generally indicate that the peak of ordering has not yet been reached and they are still cramming order books as the result of the present demand. While there is virtually no skilled labor to be had, the efficiency of learner systems and apprentice schools now operating in the various plants as well as the Governmental public school courses, are assisting vitally in solving the problem. Supply of materials is becoming tighter daily, but so far only minor shipping delays, because of inability to get material, particularly motors, is reported.

September Gear Sales Down Sharply



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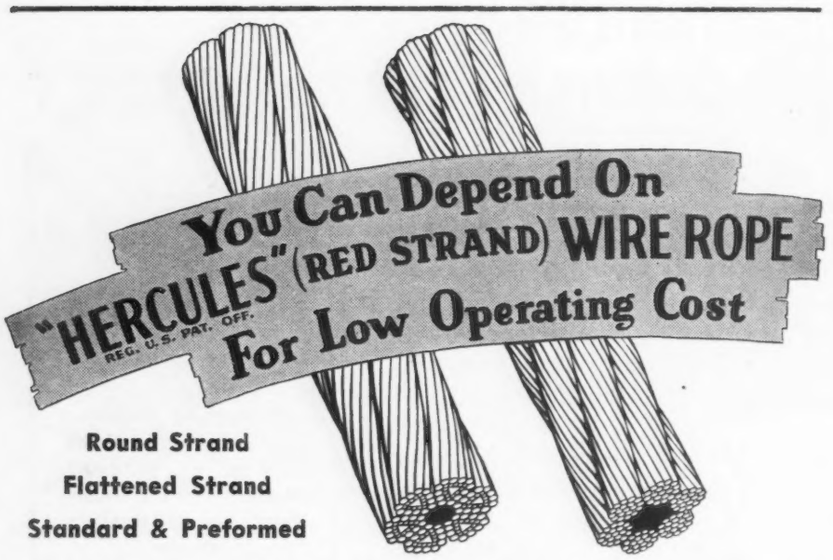
Yoder Awarded Gun Contract

Cleveland

• • • **The highlight of** the week in machine tool circles here was the receipt of a $7,200,000 contract by Yoder Co., for the manufacture of 57 mm. antitank guns. At present Yoder is working on a large shell contract, but the new order means that it will soon be in the market for several pieces of large and expensive machinery. Moreover, it is understood that Jack & Heintz will soon expand its operations to about double its present activities. This will also mean a large amount of buying of various machine tools.

Recent purchasers of machine tools working on high priorities orders have thus far found no over-supply of labor being made available by curtailment of activity in non-defense plants. The personnel manager of a large machining plant here told THE IRON AGE that many ads in Detroit newspapers for various important shop jobs had failed to bring to light any satisfactory candidates for the openings. Meantime, plants continue to resort to training programs for breaking in young men just out of school.



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** Established 1857
5909 Kennerly Avenue, St. Louis, Mo.
New York • Chicago • Denver • San Francisco • Seattle • Portland

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Civilian Copper Use Cut Sharply

• • • **The most drastic** restrictions yet imposed upon non-defense metal working industries, resulting from the need for metals for national defense, were issued by OPM this week, forbidding the use of copper in the manufacture of civilian products. The controls established on copper and brass, effective Oct. 21, were as follows: (1) The use of copper in the manufacture of more than 100 civilian products is restricted to about 60 per cent of the 1940 base period until Jan. 1, 1942; (2) After Jan. 1, the use of copper for these items is completely banned except for non-decorative plating; (3) The use of copper for all items not listed by OPM is reduced to 70 per cent of the 1940 base period; (4) Any use of copper in building construction is prohibited after Nov. 1, 1941; (5) Copper scrap, domestic, imported and virgin copper are covered by this order.

The prohibited list includes seven general categories: building supplies and hardware, house furnishings and equipment, dress accessories, jewelry and novelties, burial equipment, automotive and tractor equipment, and a miscellaneous list.

Seven exceptions to the order are made. Restrictions do not apply to Army, Navy, Lend-Lease or other Government defense agency contracts where the use of copper is specified; to products covered by underwriter or other safety regulations in effect Oct. 1; to copper used as electrical conductors; in chemical plants and oil refineries where corrosion makes other materials impractical; in research laboratories, hydro-electric plants, and for condenser or heating exchanger tubes and tube sheets in steam generating plants.

Following the upward revision of primary zinc prices last week, OPA this week announced a new zinc scrap price schedule, increasing the ceiling on scrap and secondary slab zinc, placing all scrap on a shipping point price basis, and establishing a premium system for quantity shipments. The revised ceiling prices are: New zinc clippings and trimmings, and engravers' and lithographers' plates, 7.25c. per lb.; old zinc scrap, 5.75c.; unsweated zinc dross and diecast slab, 5.80c. per lb.; new die cast scrap, and old and new radiator grills, 4.94c.; old die cast, 4.50c. per lb.

The order last week by the President for all American vessels to seek friendly ports in the Far East will have an immediate effect on the tin situation in this country. While the navy can insure against complete stoppage of tin moving to United States from the Far East, probably there is more satisfaction in the fact that, in so far as tin is concerned, there is about 11 months' supply on hand in this country. Discussions on a price advance for domestic tin to meet current high Far Eastern prices have not reached the formal stage yet, but there is considerable talk along this line, and something more official may develop shortly.

Non-Ferrous Prices

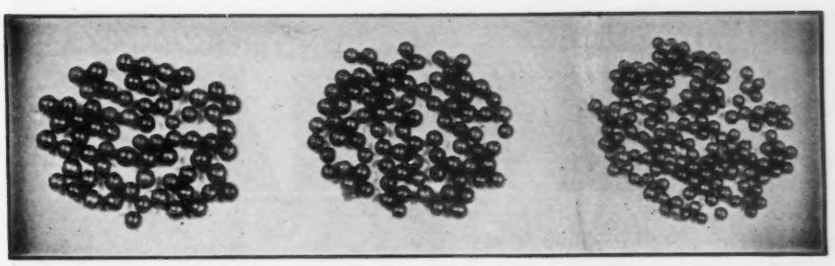
(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	5.70

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-17c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $195 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

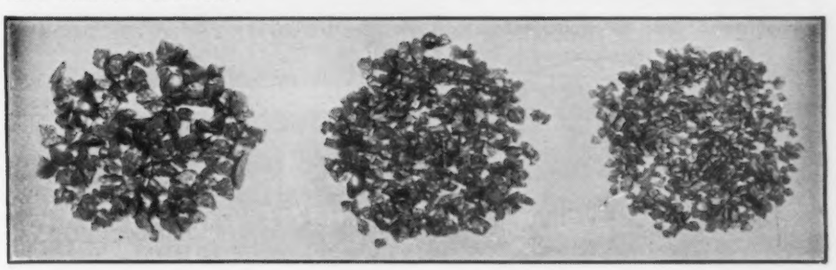
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



SCRAP

. . . MARKET ACTIVITIES AND PRICE TRENDS

Mills Reporting More Shortage

• • • **At Coatesville, Pa.,** and Buffalo more open hearth furnaces became idle this week because of the difficulty in obtaining scrap. Foundry grades continued very scarce in many areas. Meanwhile, Washington struggled to perfect a master form for consolidating the numerous reports which will be received under the new mandatory priority setup announced Oct. 9 for iron and steel scrap.

The priority order looms as one of the most difficult to administer of any issued so far in the defense effort. At the same time it will not increase the available supplies of scrap nor correct the overgrading of scrap now prevalent.

Two main features which are expected to have the greatest repercussions are the allocating of scrap and the collection of complete data on inventory, sales, shipments and consumption.

In a small way scrap already has been redirected under the present priority setup mostly by verbal orders. When it becomes necessary to divert scrap to a certain plant, regardless of the effect on prior scrap commitments, many difficult questions are going to be raised.

Even some consumers of scrap who report a fair inventory may be forced to yield some of this material, as has already been done in the case of pig iron. Brokers or dealers may be directed to ship a specified amount of available scrap in their hands or coming to them, to a consumer other than the one to whom the scrap was to be consigned.

If the severe shortage of scrap arises as expected, a variety of problems not now fully realized may occur. Conditions might arise whereby scrap will be assigned on the basis of the per cent of national defense business which a consumer holds.

Probably the question most puzzling to scrap dealers is how allocations will be enforced in each district. Who will pay the extra freight? Who will decide where the scrap must come from to fill an allocation? Who is going to line up the dealers and collectors necessary to fill a large order?

The question of grading is just as difficult. Some mills maintain entirely different standards than others. A dealer may be asked to ship to a customer who won't accept his grade of scrap. The question of who will be the final arbiter of specifications is not easily solved.

There were no changes in the price ceilings last week and all hope of a general lifting seems gone. In certain areas, notably the Pacific Coast, an investigation will be undertaken with a view toward possible adjustments, but probably they will be modest in nature.

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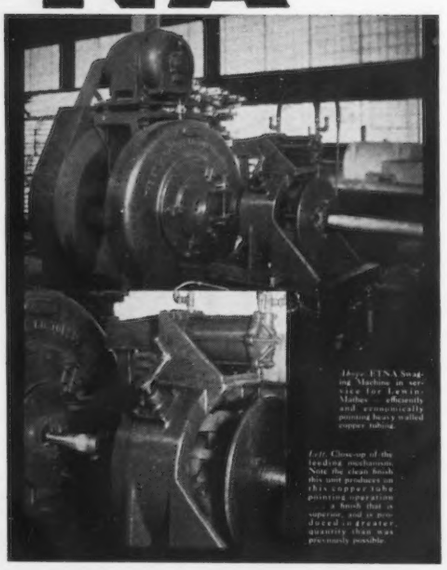
ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

Five Furnaces Idle At Buffalo, Lacking Scrap

Buffalo

• • • **Bethlehem Steel Co.'s** plant at Lackawanna shut down two more open hearth furnaces early this week because of the lack of scrap. This brings the number of furnaces shut down since last Friday to five and cuts the Buffalo district ingot rate from 106.0 to 98.5 per cent of capacity.

Prospects now are that the plant, which is the largest single industry in the Buffalo area, will have to limp along for the remainder of the year and probably well into 1942 unless the OPM is able to rush scrap metal to Lackawanna from other parts of the country. Scrap men here believe this very unlikely.

In normal times the Lackawanna plant has a reserve scrap stockpile of about 175,000 tons at this time of year to carry operations through the winter. Present reserves are reported in the neighborhood of 25,000 tons.

Republic Steel Corp. here continues to operate at capacity.

Scrap Shortage Curtails Lukens Open Hearth Output

Coatesville, Pa.

• • • **Lukens Steel Co.** reported that one open hearth furnace was taken off this week because of scrap shortages. Lukens is the second non-integrated mill in the Eastern Pennsylvania area that curtailed open hearth production in the past few weeks. Worth Steel Co., at Claymont, Del., was the first.

Indications are that several other small mills will be forced to limit operations within the next two weeks if more scrap is not forthcoming. Generally, there is little more than one to two weeks' supply on hand at present, with few shipments moving in. In order to avoid being forced to shut down several furnaces, producers are contemplating shutting down one furnace within a short time and spreading the supply of scrap over the furnaces remaining in production.

Armco Gets Scrap Allocation

Ashland, Ky.

• • • **By special allocation of** old material to the Ashland unit of the American Rolling Mill Co., a seventh open hearth was placed in operation this week. Two weeks ago this unit had been forced to curtail its active furnaces to five out of a total of eight, because of lack of old materials. Possibility of obtaining sufficient scrap to operate eight furnaces is not great, the company officials indicate, but feel that a maximum production on seven furnaces is possible.

•

Cleveland—Many foundries are paying over the ceiling price for scrap. There are reports of transactions as high as $30 a ton. One reason is that normally only about 30 per cent of cast scrap used here originates in this area. Thousands of automobiles are reported lying idle in fields throughout the North Central states, literally "frozen" at their various locations, due to the impossibility of transporting these abandoned cars to central wrecking points. Present prices make it impossible to move this material unless some indirect Federal concession is made in the form of subsidizing transportation costs or permitting the use of WPA labor to perform the necessary demolishing work.

•

Cincinnati—With the responsibility for obtaining old materials taken from the dealers to Washington, the trade generally shows a spirit of compliance with the government regulations. Visible supplies of scrap indicate at least three to four weeks' operations.

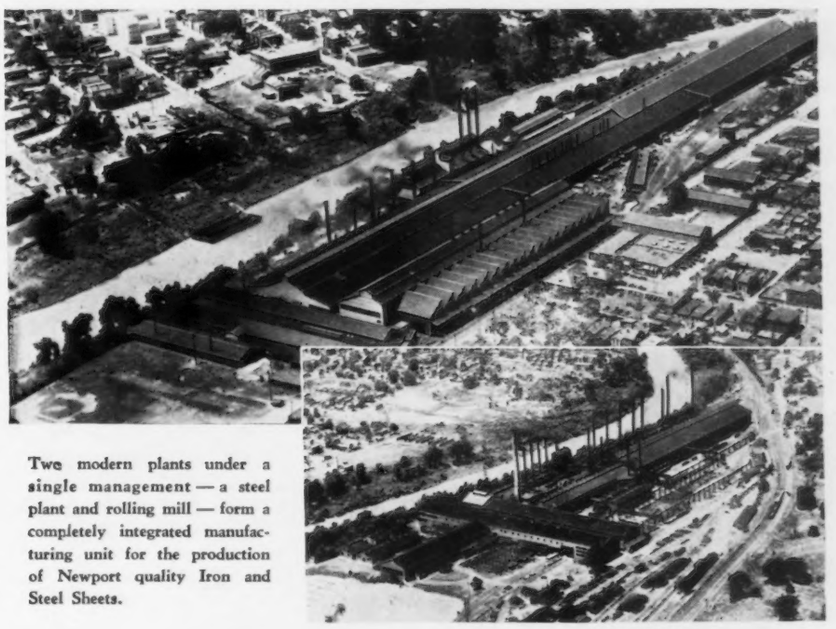
•

Detroit—The trade has not been able yet to gage the effects of scrap priorities. At most the priority regulations are looked upon as little more than official requirements for an extensive bookkeeping system. The strike which closed Great Lakes Steel Corp. plants will probably permit the accumulation of some extra scrap for this company's furnaces which have been operating on a hand-to-mouth basis for many weeks.

St. Louis—Shipments from Texas have been disappointing; a survey revealing that because of long distance "truckers" decline to handle scrap at present prices. Mills have not curtailed production because of lack of material, although the shortage is becoming acute.

•

Birmingham—While little change in the scrap flow is apparent, steel men here are hopeful the government's priority action will bring in supplies adequate for the maintenance of the high operations rate.



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NEWPORT KENTUCKY
DIVISION OF THE ANDREWS STEEL CO.

ANDREWS PRODUCTS IN BASIC OPEN-HEARTH CARBON AND ALLOY STEEL: BARS • PLATES • UNIVERSAL MILL PLATES • SHEET BARS • BILLETS • BLOOMS • SLABS.

Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPA to Sept. 26, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points → / ▼ GRADES	Pittsburgh	Johnstown, Weirton, Steubenville, Youngstown, Warren, Sharon, Canton	Chicago	Kokomo	Bethlehem	Claymont, Coatesville, Phoenixville, Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	Cincinnati*, Portsmouth, Middletown, Ashland	St. Louis	Detroit	Duluth, Minneapolis**	Birmingham	Chattanooga	Radford, Va.	Worcester, Bridgeport, Phillipsdale, R. I.	Los Angeles, San Francisco, Seattle, Portland	Minnequa, Colo.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.25	$19.50	.....	$19.50	$17.50	$17.85	$18.00	$17.00	.....	.....	.....	14.50	16.50
No. 1 hyd. comp. black sheet	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	(See	13.50	15.50
Dealers' No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	foot-	13.50	15.50
Dealers' No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	notes)	12.50	14.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	.....	12.25	.....	.....		9.75	11.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	Alloy, 17.60	W.Va.	.....	10.00	12.00
Shoveling turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	.....	.....	.....	.....	11.00	13.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.00	.....	.....	.....	14.00	16.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	10.00	12.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	[6]15.25	13.25	13.60	13.75	12.75	.....	.....	.....	10.25	12.25
Uncut structural, plate scrap	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	18.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	*19.00	20.00	20.50	21.00	22.00	18.00	....
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	*17.50	18.50	.....	.....	20.50	17.00	....
Stove plate	19.00	[5]19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	*16.00	17.00	17.50	18.00	17.50	14.00	....
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	19.50	....
Low phos. bar crops, smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	19.50	....
Low phos. pu'ch'gs., plate scrap[1]	24.75	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	17.50	....
Machinery cast, cupola size[2]	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	*20.00	21.00	21.50	22.00	23.00	19.00	....
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	....
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	....
Punchings and plate scrap[3]	23.75	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20 00	19.00	.....	.....	.....	16.50	....
Punchings and plate scrap[4]	22.75	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	15.50	....
Heavy axle, forge turnings	21.25	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	14.00	....
Medium h'vy. el. f'ce. turnings	19.75	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	12.50	....

[1] This grade is ⅜-in. and heavier, cut 12 in. and under. [2] May include clean agricultural cast. [3] Under ⅜ to ¼-in., cut 12 in. and under. [4] Under ¼-in. to No. 12 gage, cut 12 in. and under. [5] Youngstown, Warren, Sharon and Canton are not basing points on this grade. [6] Middletown and Cincinnati price for this grade is $15. * Includes Newport, Ky. Shipping point price within Cincinnati basing point may be 50c. a ton below basing point price listed above for all grades except the six cast grades. ** Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

Railroad Scrap *(Per gross ton, delivered consumers' plants located on line of railroad originating scrap)*

Basing Points → / ▼ GRADES	Pittsburgh, Sharon, Pa., Wheeling, Steubenville, Youngstown, Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth, Middletown, Ashland	St. Louis	Kansas City	Cincinnati	Detroit	Duluth	Birmingham	Los Angeles, San Francisco, Seattle
No. 1 heavy melting	$21.00	$19.75	$19.25	$19.75	$19.75	$19.75	$20.50	$20.25	$20.50	$18.50	$17.00	$20.50	$18.85	$19.00	$18.00	$15.50
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	21.50	19.85	20.00	19.00	16.50
Rerolling rails	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	23.00	21.35	21.50	20.50	18.00
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	23.50	21.85	22.00	21.00	18.50
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	23.75	22.10	22.25	21.25	18.75
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	24.00	22.35	22.50	21.50	19.00

Railroads not operating in a basing point may sell rerolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Rerolling mills may absorb all transportation charges necessary to obtain such rails. Maximum prices for scrap rails and rerolling rails from mines, logging camps and similar sources need not be sold for less than $13.50 a gross ton for scrap rails and $15 for rerolling material at shipping point.

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than $1 prices (for material other than railroad scrap) for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which the scrap is to be shipped to a consumer. A shipping point price is computed as follows: (a) For Shipping Points located within a basing point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For shipping points located outside a basing point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Deduct from this the lowest established charge for transporting scrap from the shipping point to such basing point. *Exceptions:* (1) The shipping point price at any shipping point in New England, of those grades of scrap for which no prices are listed above shall be the Johnstown basing point price, minus the all-rail transportation costs from the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

GULF PORT PRICES: Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding $14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas and Oklahoma. Maximum shipping point price of remote scrap is $12 a gross ton, for No. 2 heavy melting steel, with differentials for other grades the same as differentials established in table above for St. Louis. The maximum delivered price of remote scrap is the shipping point price, plus actual transportation charges, except that when necessary to absorb transportation charges, the maximum delivered price may be exceeded by a maximum of $4 a ton. Thus the maximum delivered price for remote scrap may exceed the price for the nearest basing point by $5. In the event that an allowance in excess of $5 a ton is necessary to acquire a tonnage of remote scrap, a consumer may apply to OPA for permission to exceed the $5 allowance. Purchases under these remote scrap provisions must be for not less than one car a month and must be reported in detail. Provisions of this remote scrap section expire Dec. 31, 1941.

BROKER COMMISSIONS: A commission of up to 50c. a ton above the maximum prices is allowed to brokers.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is $2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than $2.50 in transportation charges. Lowest established transportation charges will govern.

Non-Ferrous Scrap

(Dealers buying prices, cents per lb.)

	New York	Philadelphia	Pittsburgh	Cleveland	Detroit	Chicago
No. 1 hvy. copper	*10.00	*10.00	*10.00	*10.00	*10.00	*10.00
Light copper	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00
Hvy. yel. brass	6.25-6.50	**6.25	7.50-8.00	5.75-6.25	7.00-7.25	7.50
Light brass	5.25-5.50	**5.50	7.00-7.25	6.00-6.50	6.50-6.75	7.00-7.25
No. 1 Comp. turn.	8.75-9.00	**7.75	**9.00-9.25	8.50-9.00	9.00-9.25	9.00-9.25
New brass clips	8.00-8.25	8.50-9.00	7.75-8.00	8.00-8.50	7.50-8.00	7.75-8.25
Soft lead	5.25-5.50	5.00-5.25	4.75-5.00	4.75-5.00	5.00-5.25	4.75-5.00
Old zinc	* 5.75	* 5.75	* 5.75	* 5.75	* 5.75	* 5.75
Cast, forged alum.	**9.00	**9.00	**9.00	**9.00	**9.00	**9.00
Old sheet alum.	**9.00	**9.00	**9.00	**9.00	**9.00	**9.00
Solder joints	9.00-9.25	9.00	7.50-8.00	6.50-6.75	5.50-6.00	7.75 8.25
No. 1 pewter	35.00-36.00	35.00-36.00	31.00-32.00	32.50-34.00	37.50-38.50	32.00-34.00

* OPA maximum for sale by dealer. ** Nominal.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

	Oct. 21, 1941	Oct. 14, 1941	Sept. 23, 1941	Oct. 22, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Oct. 21, 1941	Oct. 14, 1941	Sept. 23, 1941	Oct. 22, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.50
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh	22.00	22.00	22.00	21.75
No. 1 cast, Philadelphia	24.00	24.00	24.00	22.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	17.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connelsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$4.75
Foundry coke, prompt	6.875	6.875	6.875	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	51.625
Zinc, East St. Louis	8.25	7.25	7.25	7.25
Lead, St. Louis	5.70	5.70	5.70	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in detailed price tables, pages 118-124.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

FINISHED STEEL	PIG IRON	SCRAP STEEL
Oct. 21, 1941.....2.30467c. a Lb.....	.....$23.61 a Gross Ton.....	.....$19.17 a Gross Ton.....
One week ago.....2.30467c. a Lb.....	.....$23.61 a Gross Ton.....	.....$19.17 a Gross Ton.....
One month ago.....2.30467c. a Lb.....	.....$23.61 a Gross Ton.....	.....$19.17 a Gross Ton.....
One year ago.....2.30467c. a Lb.....	.....$22.61 a Gross Ton.....	.....$20.67 a Gross Ton.....

	High	Low	High	Low	High	Low
1941.....	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939.....	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933.....	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932.....	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ([10])			3.37¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢([11])		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. =2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	..... $31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

† Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$5.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	....
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.50	....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.63	....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43. **Over 4 in. wide and over 1 in. thick, $4.95.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6 ½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

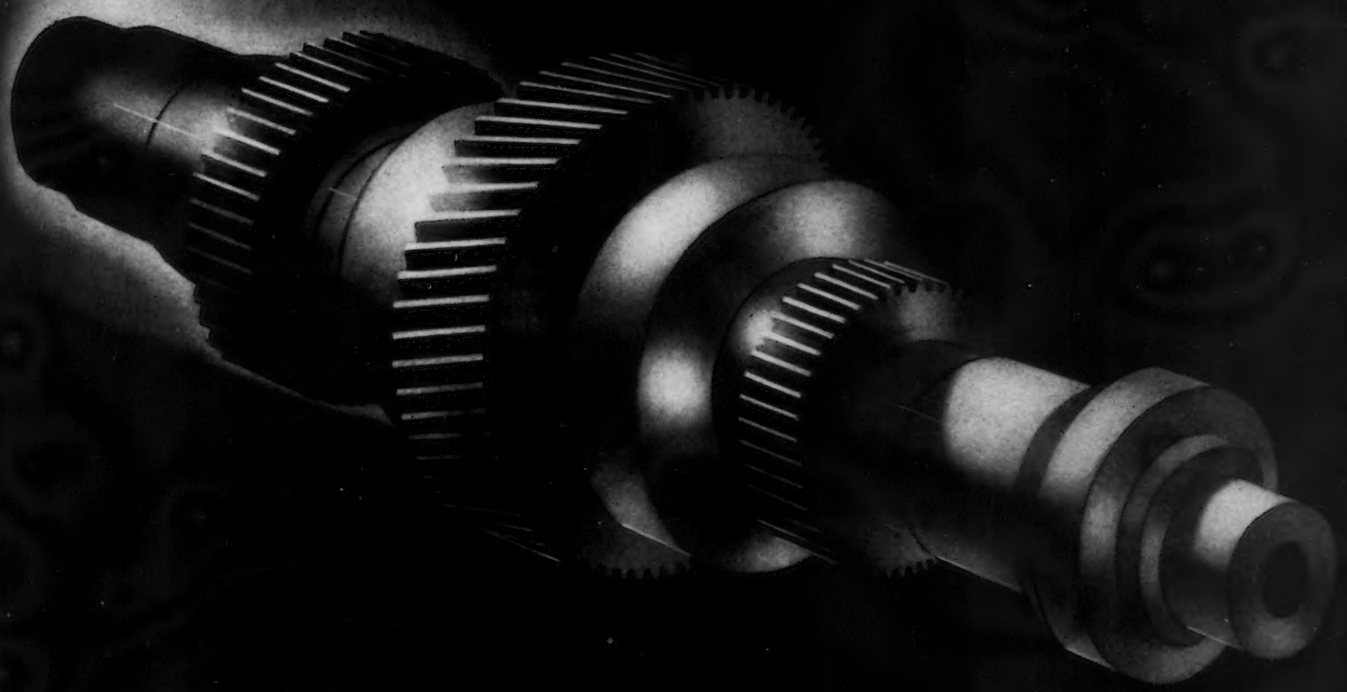
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.

The best material need not be the most expensive. Investigate Chromium-Molybdenum Steels.



One machine tool manufacturer — looking for "the best" in spindle steels — has standardized on Chromium-Molybdenum "4145".

This low cost alloy steel meets the stringent demands of wear resistance and toughness put upon the spindle to produce long-lived accuracy in lathe-produced parts.

Write for our free technical book, "Molybdenum in Steel".

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Climax Molybdenum Company
500 Fifth Avenue · New York City

MOLY

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)...$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Tons, base 6.00 to 6.50 Si.

F.O.B. Jackson, Ohio $29.50*
Buffalo $30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

* Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon .....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less $2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equalized with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsato (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... $4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn..65c. to 66c.
African, Indian, 49-51 Mn..67c. to 69c.
Brazilian, 46-48 Mn .....69c.
Cuban, del'd, 51 Mn .....78c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade).....Nom.
Rhodesian, 45 .....$32.00
Rhodesian, 48 .....$39.00-$40.00

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace *Per Net Ton*

Connellsville, prompt ...$6.00 to $6.25

Foundry

Connellsville, prompt ...$6.75 to $7.00

* Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. † F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis $12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton $40.00
Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast ..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$22.00 to $23.00
Domestic, f.o.b. Ohio River landing barges ..... 22.00 to 23.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..22.00 to 23.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.... 31.00
As above, in bags, f.o.b. same mines 32.60

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois 46.55
Second quality, New Jersey.... 51.00
No. 1, Ohio 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks $44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

CHIKSAN

"WE CAN DO ALMOST ANY TYPE OF CUTTING WITH OUR AXELSON LATHE

"Got to make some deep rough cuts on this job. Do I worry about that with this Axelson? I should say not! I speed up my feet-per-minute and dig in without a chatter. And this is no ordinary chunk of steel. When I get near the contour shown on the blueprint, the real fun starts. The job begins to shine like a mirror as she smoothes down. And she's going some. I'm away inside the time limit on the ticket. I give her a test mike. Once or twice over again and I'm less than the thickness of a coat of paint from the tolerance. Easy now. And there she is—with a finish that looks like she just came from a centerless grinder. This kind of work makes a fellow confident—and anyone can always be confident with these Axelson Heavy Duty Lathes."

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USES AXELSON

AXELSON HEAVY-DUTY LATHES

WRITE TODAY for your copy of Axelson's latest bulletin giving detailed information on all sizes and types of Axelson Lathes.

SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Bridgeport Brass Co.**, Bridgeport, Conn., has taken out permit for one-story and basement addition, 150 x 525 ft., with wing extension, 22 x 200 ft., for a rod mill for production for government. Cost over $500,000 with equipment. Stone & Webster Engineering Corp., 49 Federal Street, Boston, is architect and engineer.

Crompton & Knowles Loom Works, Inc., Worcester, Mass., has let general contract to E. Whitehead, Inc., Union Street, for one-story addition, 65 x 125 ft., for a forge shop, also for improvements in present plant. Cost over $65,000 with equipment.

General Alloys Co., 405 First Street, Boston, plans one-story factory for production of aircraft equipment for government. Cost about $91,100, fund to be furnished by Defense Plant Corp., Washington.

Wire Rope Corp. of America, Inc., Congress Avenue, New Haven, Conn., has approved plans for one-story addition, 115 x 150 ft. Cost close to $60,000 with equipment. Leo F. Caproni, 1221 Chapel Street, is architect.

Firestone Rubber & Latex Products Co., 172 Ferry Street, Fall River, plans early replacement of equipment destroyed in fire, Oct. 12, when five multi-story buildings were destroyed. Entire loss reported over $10,000,000.

Scott & Williams, Inc., Laconia, N. H., knitting machinery and parts, plans one-story plant near present works for production of aircraft equipment for government. Cost about $609,300 for building and equipment, fund to be secured through Defense Plant Corp., Washington.

New Departure Division, General Motors Corp., Bristol, Conn., steel balls, ball bearings, etc., has let general contract to George A. Fuller Co., 587 Madison Avenue, New York, for one-story and basement addition, 160 x 580 ft., for production of aircraft parts for government. Cost over $650,000 with equipment. This is part of expansion to be carried out for manufacture noted, and for which fund of about $2,442,000 is being secured from Defense Plant Corp., Washington.

Apex Refrigerator Sales Corp., 54 East Eleventh Street, New York, has leased five-story and basement factory at 626 Tenth Avenue, about 14,000 sq. ft. of floor space, for storage, distribution, service department and other divisions.

Superior Marking Machines Co., 45 Lispenard Street, New York, machinery and parts, plans new one-story plant at Ridgefield, N. J., where tract, about 200 x 200 ft., has been acquired. Cost over $50,000 with equipment.

Phelps-Dodge Copper Products Corp., 40 Wall Street, New York, has plans for new works on 41-acre tract on Compton-Jaboneria Road, near Slauson Avenue, Los Angeles, for production of condenser tubing for government. It will include storage and distributing buildings and other structures. Cost about $3,000,000, fund in that amount to be secured through Defense Plant Corp., Washington. Company engineering department, 25 Broadway, New York, is in charge.

Arco Metalcraft, Inc., 29 Hopkins Street, Brooklyn, metal products, has purchased former plant of Silk Finishing Co. of America, Inc., East 144th Street and Brook Avenue, Bronx, totaling about 100,000 sq. ft. of floor space, for new plant for increased capacity.

American Propeller Corp., an interest of Aviation Mfg. Corp., 420 Lexington Avenue, New York, organized to specialize in aircraft propellers and parts, has let general contract to Austin Co., Cleveland, for new plant at Toledo, Ohio, for production for government, which will provide fund of about $3,632,300. Of this amount approximately $2,650,000 will be expended for equipment.

Vanadium Corp. of America, Inc., Saunders Settlement Road, Niagara Falls, N. Y., has work under way on one-story addition for laboratory, for which general contract recently was let to Rust Engineering Co., Clark Building, Pittsburgh. Cost close to $50,000 with equipment.

Symington-Gould Corp., 20 Symington Place, Rochester, N. Y., iron castings and railroad specialties, plans new local works for production of ordnance equipment for government, comprising main one-story unit and auxiliary structures. Cost about $1,255,100, fund in that amount to be furnished by Defense Plant Corp., Washington.

Electro Metallurgical Co., 137 Forty-seventh Street, Niagara Falls, N. Y., has let general contract to Walter S. Johnson Building Co., 2532 Hyde Park Boulevard, for two-story addition, about 47 x 120 ft., for laboratory and technical service. Cost over $50,000 with equipment.

Houde Engineering Corp., 537 East Delavan Avenue, Buffalo, automotive equipment, will expand production facilities with installation of additional equipment for manufacture of airplane equipment for government, which has authorized fund of $731,000, in addition to former appropriation, through Defense Plant Corp.

Elastic Stop Nut Corp., 2330 Vauxhall Road, Union, N. J., self-locking nuts, etc., has approved plans for one-story addition, 140 x 250 ft., for which superstructure will begin soon. Cost close to $125,000 with equipment.

Virginia Dare Extract Co., 882 Third Avenue, Brooklyn, wines and beverages, has purchased 10-acre tract at Bendix, N. J., for new one and three-story production, mechanical-bottling, storage and distributing plant, totaling about 100,000 sq. ft. of floor space. Cost over $250,000 with equipment. It is understood that company will abandon plans for proposed plant at Linden, N. J., previously announced.

Clorox Chemical Co., 51 Pacific Avenue, Jersey City, N. J., has let general contract to Bonnano Construction Co., Inc., 8533 Tonnelle Avenue, for one and two-story addition, 85 x 255 ft., for storage and distribution. Cost over $115,000 with equipment.

Singer Mfg. Co., Elizabeth, N. J., plans installation of additional equipment in local plant, branch plant at Bridgeport, Conn., and new plant of Diehl Mfg. Co., same address, a subsidiary, now in course of construction at Finderne, Bridgewater Township, N. J., for production of ordnance for government. Cost estimated at $2,500,000 and fund in that amount will be furnished by Defense Plant Corp., Washington; this appropriation is in addition to a previous allotment of $1,525,000. New Diehl plant will approximate 240,000 sq. ft. of floor space, and cost over $1,000,000 with machinery.

Isolantite, Inc., 343 Cortlandt Street, Belleville, N. J., electrical insulators, etc., has let general contract to John W. Ryan Construction Co., 369 Lexington Avenue, New York, for three-story and basement addition, about 100 x 200 ft., and improvements in present plant, for production of radio equipment for government. Fund of about $972,700 has been secured through Defense Plant Corp., Washington.

Bethlehem Steel Co., Bethlehem, Pa., has approved plans for one-story addition, about 70 x 495 ft., for expansion in drop forge shops; also a two-story and basement structure, 60 x 115 ft., will be built for new welfare unit for workers. Cost over $350,000 with equipment.

Eastern Specialty Co., 3617 North Eighth Street, Philadelphia, electrical products, plans expansion in production facilities for aircraft equipment for government, to cost about $100,300. Fund in that amount is being furnished by Defense Plant Corp., Washington, for this purpose.

Penn Steel Castings Co., Front and Penn Streets, Chester, Pa., plans rebuilding part of plant recently destroyed by fire. Loss over $400,000 with equipment.

Erie Lighting Co., Erie, Pa., plans expansion in steam-electric generating station on Front Street, with installation of new turbine-generator and auxiliaries, high-pressure boilers and auxiliary equipment; also will make extensions in transmission lines. Cost over $2,500,000.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for 39 electrically-operated drydock capstans for Navy yards at Portsmouth, N. H., Philadelphia, and Charleston, S. C.; Roosevelt Base, Terminal Island, Cal.; and Naval operating base, San Diego, Cal. (Specification 10661). Also bids (no closing date stated) for air-conditioning system at Naval experimental model basin, Carderock, Md. (Specification 10590).

Scully Steel Products Co., Bush and Wicomico Streets, Baltimore, has let general contract to H. J. Dudley Co., 102 West Chase Street, for one-story addition for storage and distribution. Cost close to $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 28 for one motor-driven horizontal flange punch (Schedule 8978), 14 cast steel chains and 14 dielocks (Schedule 9001), 20 steel mooring buoys (Schedule 8988), 30 15,000-lb. cast steel anchors (Schedule 8982), 75,000 galvanized iron buckets (Schedule 8940) for Eastern and Western Navy yards; until Oct. 30 for hexagon steel nuts (Schedule 8989) for Brooklyn and Mare Island Navy yards.

The South

• **Reynolds Metals Co.**, 311 West Broadway, Louisville, plans expansion in extruded metal plant for production for government including equipment to cost about $279,400. Fund in that amount will be furnished by Defense Plant Corp., Washington, in addition to previous sum of $2,920,580 for plant development for this output.

United States Sugar Corp., Clewiston, Fla., plans new works adjoining present mill for production of starch, using sweet potatoes as raw material, comprising one and multi-story processing and production units, and other structures. Cost over $2,500,000 with equipment. Company recently arranged for sale of 200,000 shares of preferred stock, part of proceeds to be used for purpose noted.

General Tire Engineering Co., Flora, Miss., subsidiary of General Tire & Rubber Co., Akron, Ohio, will begin superstructure soon for new local bag-loading plant to be operated for government, and to be known as Mississippi Ordnance Plant. Cost estimated at $11,000,000, fund to be furnished by Defense Plant Corp., Washington.

United States Engineer Office, Memphis, Tenn., asks bids until Oct. 27 for wire rope (Circular 51).

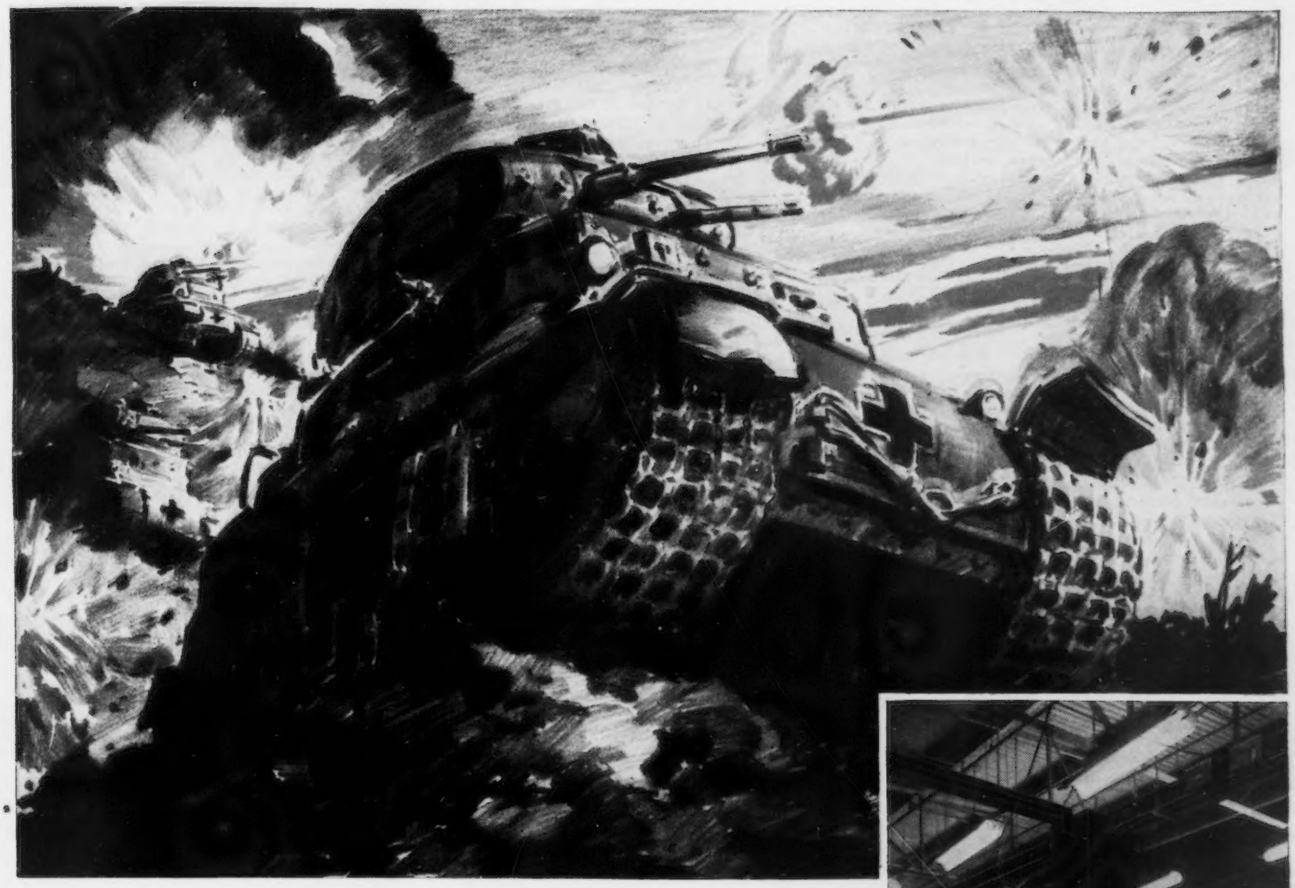
Constructing Quartermaster, Richmond Quartermaster Depot, Richmond, Va., has let general contract to Doyle, Russell & Wise Contracting Co., Inc., Central National Bank Building, for two one-story warehouses at local depot. Cost about $1,250,000 with mechanical-handling and other equipment.

City Council, High Point, N. C., plans new steam-electric generating station for supplemental service in connection with new municipal hydroelectric power plant now under way. Cost about $1,500,000, with turbine-generator units, boilers and auxiliary equipment. Financing is being arranged through Federal aid. William C. Olsen, 5 Exchange Place, Raleigh, N. C., is consulting engineer.

General Motors Corp., Fisher Body Division, Detroit, plans further expansion in automobile

WITH TANKS ON THE MUSCLE

American Defense Plants Speed Production with Bull Dog "Plug-in" Light and Power



This photograph in a great new defense plant shows a close-up of a run of Bull Dog 1500 ampere "Plug-in" Type BUStribution DUCT, with a branch run of 750 ampere capacity tapped off through a Bull Dog 3-pole 800 ampere Switch Adaptor.

NEW defense plants can't wait while electric wiring is planned for each machine. They *must* have a power distribution system which is ready for operation as soon as the walls are up. So power-wise defense builders choose Bull Dog "plug-in" Bus Duct Systems, which give *ready* light and power anywhere.

Bull Dog's three flexible electrical distribution systems were developed for and "grew up" with mass production. As modern as today's mechanized warfare, these systems and their various supplementary devices enable you to "plug in" individual machines in your factory as simply as you "plug in" a reading lamp at home.

For Any Combination of Machines and Building

Bull Dog BUStribution DUCT — *for Power* — is an enclosed busbar system which makes ample current available, instantly, anywhere in your plant, through "plug-ins" at ten-inch intervals.

Universal Trol-E-Duct—*for Light*—a busway system into which any type of lighting fixture can be plugged — where and when required.

Industrial Trol-E-Duct—*for Production Lines or Assembly Benches*—provides mobile current and support for portable tools, and in addition is widely used to parallel monorail crane and hoist systems.

BULL DOG
ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
Bull Dog Electric Products of Canada, Ltd., Toronto, Ontario

A Permanent Asset Value

All three Bull Dog Bus Duct Systems are completely salvable and reusable—and can be moved, rearranged, or expanded at any time to provide for any future conditions.

To learn how you can avoid delays from old-fashioned, complicated wiring systems, write for complete illustrated bulletins on Bull Dog flexible electrical distribution—or, better yet, let us have one of our engineering representatives talk to you about equipping your present plant, or the new plant you may be planning.

ORIGINATORS OF FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS FOR LIGHT AND POWER

body works at Memphis, Tenn., being converted for production of aircraft equipment for government. Cost about $3,450,500, fund to be supplied by Defense Plant Corp., Washington. This is in addition to $3,957,000 previously secured for plant at same place.

Dedman Foundry & Machine Co., 415 North St. Charles Street, Houston, Tex., machinery and parts, plans one-story addition, about 60 x 70 ft. Cost over $40,000 with equipment. Edward Bodet, 1806 Milam Street, is architect.

War Department, Twentieth Street and Constitution Avenue, S. W., Washington, has contracted with Lion Oil Refining Co., El Dorado, Ark., for operation of new government-owned plant near last noted place for production of synthetic ammonia and ammonium nitrate, comprising processing and general production units, with storage and distributing buildings, natural gas supply and control station, machine shop and other structures. Plant will use on a basis of 20,000,000 cu. ft. of natural gas daily, to be secured from gas fields near plant. Cost about $23,000,000 for land, buildings and equipment.

Central States

● **Tube Craft, Inc.,** 1328 West Seventy-eighth Street, Cleveland, metal tubing, has let general contract to Bolton-Pratt Co., 1276 West Third Street, for one-story addition, 45 x 105 ft. Cost close to $50,000 with equipment.

New York Coal Co., Athens, Ohio, plans rebuilding tipple and power house at coal-mining plant, recently destroyed by fire. Loss close to $85,000 with equipment.

George Wiedemann Brewing Co., Inc., 601 Columbia Avenue, Newport, Ky., has let general contract to Fisher-DeVore Construction Co., Idlewild and Dana Avenues, Cincinnati, for one-story storage and distributing plant, 115 x 196 ft., at Tennessee Avenue and Paddock Road, Cincinnati. Cost over $80,000 with equipment. W. W. and W. A. Cordes, Times-Star Building, Cincinnati, are architects.

Twin Coach Co., Kent, Ohio, motor buses and parts, plans one-story addition, about 40,000 sq. ft. of floor space, largely for construction of new trailer fire-pumper, including parts and assembling divisions. Cost over $150,000 with equipment.

Osborn Mfg. Co., 5401 Hamilton Avenue, Cleveland, foundry molding equipment, parts, etc., has let general contract to R. C. Rutland, Lost Nation Road, Willoughby, Ohio, for one-story addition, 40 x 110 ft. Cost over $50,000 with equipment. J. Wallace Green, Johnson Building, Painesville, Ohio, is engineer.

War Department, Washington, plans new plant for production of synthetic ammonia and ammonium nitrate at South Point (Lawrence County), Ohio. It will comprise one and multi-story buildings for processing and general production, storage and distributing structures, boiler house, machine shop and other buildings. Cost reported over $15,000,000.

Broderick Boiler Co., Macedonia Avenue and line of Big Four Railroad, Muncie, Ind., boilers, tanks and kindred products, plans one-story addition. Cost about $50,000 with equipment.

Emerson Electric Mfg. Co., 1824 Washington Street, St. Louis, is completing initial unit of new plant for production of aircraft gun turrets for government, totaling about 140,000 sq. ft. of floor space. Other units to be built on adjoining site will approximate 564,000 sq. ft. additional floor space. Cost about $10,500,000, and fund in that amount has been secured through Defense Plant Corp., Washington. Austin Co., Cleveland, is general contractor.

United States Engineer Office, Missouri River Division, Davidson Building, Kansas City, Mo., asks bids until Nov. 21 for power house superstructure, penstocks and surge tanks for hydroelectric power station at Fort Peck, Mont., including installation of power house crane, stop log gantry crane, 12-ton electric hoist, transformer room crane, elevators, transformer transfer car and other equipment (Circular 1). Harza Engineering Co., 205 West Wacker Drive, Chicago, is consulting engineer.

White Eagle Division, Socony-Vacuum Oil Co., Federal Reserve Bank Building, Kansas City, Mo., plans expansion in oil refinery at Augusta, Kan., including new production unit for high octane gasoline, additions to steel tank storage department, and other facilities. Cost close to $1,500,000 with equipment.

Dock Foundry Co., Sturgis, Mich., has let general contract to Frank L. Shoemaker, Sturgis, for one-story addition for expansion in main foundry. Cost close to $40,000 with equipment.

E. I. du Pont de Nemours & Co., Inc., R. & H. Chemicals Division, du Pont Building, Wilmington, Del., has plans for branch plant at Wyandotte, Mich., on 22-acre tract fronting on Detroit River, formerly used by Detroit Shipbuilding Co. It will consist of a main three-story production unit, 60 x 70 ft., for hydrocarbon solvent products; one-story storage and distributing building, 60 x 140 ft., pumping station, gate house, machine shop, and six storage tanks, each 30 ft. in diameter, and 21 ft. high. An existing one-story building will be remodeled for laboratories, offices, etc. Entire project will cost over $500,000 with equipment.

Extruded Metals Defense Corp., Belding, Mich., recently organized subsidiary of Extruded Metals, Inc., same place, plans new works at Grand Rapids, Mich., for production of extruded aluminum alloys for government, consisting of main one-story structure, about 250,000 sq. ft. of floor space, and auxiliary buildings, with boiler house, power substation and other departments. Cost estimated at $6,266,000 for buildings and equipment, latter to represent about $3,966,000 of this sum. Appropriation in gross amount will be secured through Defense Plant Corp., Washington.

White Cap Co., 1806 North Central Avenue, Chicago, metal products, plans new one and two-story plant at Central, Major and Bloomingdale Avenues. Cost over $200,000 with equipment.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co., First National Soo Line Building, Minneapolis, Minn., has let general contract to Stahr-Burgum Co., Wesley Temple Building, for one-story building, 125 x 175 ft., at Shoreham yards for a coach shop. Cost over $75,000 with equipment.

Falk Corp., 3001 West Canal Street, Milwaukee, gears, speed reducers, couplings, etc., has superstructure under way for one-story addition, 180 x 475 ft., for which Klug & Smith Co., 111 East Wisconsin Avenue, is general contractor. Two-story office and operating building, 40 x 200 ft., also will be erected. Cost close to $700,000 with equipment.

Omaha Steel Works, Omaha, Neb., plans additional equipment for production of ordnance for government. Cost about $100,000, fund to be secured through Defense Plant Corp., Washington, in addition to $483,875, previously authorized for similar purpose.

Wisconsin Power & Light Co., 122 West Washington Avenue, Madison, Wis., plans expansion in steam-electric generating station at Beloit, Wis., including new turbine-generator unit and accessories, high-pressure boilers and auxiliary equipment; also new power substations and extensions in present units in same area, with additions in transmission and distributing lines. Entire project will cost about $4,000,000. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

Nubian Paint & Varnish Co., 1856 North LeClaire Avenue, Chicago, varnishes, paints, oils, etc., has let general contract to E. I. Leander Co., 228 North LaSalle Street, for one-story addition, 60 x 120 ft. Cost over $60,000 with equipment. N. Ronnenberg, Inc., 5050 West Grand Avenue, is architect.

Western States

● **Wire & Metal Mfg. Co.,** 5965 South Alcoa Avenue, Vernon, Los Angeles, has let general contract to William P. Neil Co., 4814 Loma Vista Street, for one-story addition, 118 x 200 ft. Cost over $65,000 with equipment. Harry T. Miller, 4814 Loma Vista Street, is architect.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, plans expansion in Midway steam-electric generating station near Bakersfield, Cal., with installation of new 60,000-kw. turbine-generator unit and accessories, two 1500-hp. high-pressure boiler units, and auxiliary equipment. Switchyard will be extended, with installation of transformers, high-tension switching equipment and other apparatus. Cost close to $7,500,000.

Bureau of Reclamation, Denver, asks bids until Oct. 29 for one 15-ton, two-motor traveling crane for government warehouse at Anderson Ranch Dam, Boise project, Idaho (Specification 1577-D). Also until Nov. 3 for one or two vertical-shaft, 115,000-hp. hydraulic turbines, and one or two oil pressure actuator-type governors for regulating speed of turbines, for Unit N-7, or Units N-7 and N-8, Boulder power plant, Boulder Canyon project (Specification 1001).

Commercial Iron Works, Inc., Seattle, plans expansion in shipyard near Ross Island bridge on waterfront, on about 14 acres adjoining, to include two covered shipways, each 60 x 325 ft.; outfitting dock, 60 x 325 ft.; one-story general shop, with mechanical departments; one-story warehouse, 60 x 350 ft., and auxiliary structures. Dock will be provided with overhead electric traveling cranes. Cost over $750,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Oct. 29 for 10 electric traveling bridge cranes for Mare Island Navy Yard (Specification 10625); until Nov. 5 for two 50-ton traveling revolving jib cranes at Roosevelt Base, Terminal Island, Cal., and Roosevelt Roads, Viques, P. R. (Specification 10608).

War Department, Washington, plans new Army supply depot near Gelena, Wash., where 2400-acre tract has been selected. Cost over $2,000,000 with equipment.

Canada

● **Chrysler Corp., Ltd.,** Windsor, Ont., has let general contract to Carter-Halls-Aldinger Co., Ltd., 419 Cherry Street, Toronto, for one-story addition, 200 x 210 ft., to plant at Chatham, Ont. Cost over $500,000 with equipment.

Dominion Forge & Stamping Co., Ltd., 2840 Seminole Street, Windsor, Ont., is erecting one-story addition, 75 x 120 ft., for which general contract recently was let to Allan Construction Co., 44 Wyandotte Street East. Cost over $70,000 with equipment.

Amalgamated Electric Co., Ltd., 384 Pape Avenue, Toronto, plans one-story addition. Cost close to $60,000 with equipment.

Aerovox Canada, Ltd., 43 Catharine Street South, Hamilton, Ont., condensers, etc., has plans by Hutton & Souter, 36 James Street South, for a new plant, to cost about $75,000 with equipment.

Canadian Durex Abrasives, Ltd., 154 Pearl Street, Toronto, will build plant addition and boiler house at Brantford, Ont., to cost, with equipment, about $300,000. Prack & Prack, 36 James Street South, Hamilton, Ont., are architects. Disher Steel Construction Co., 80 Commissioner Street, Toronto, has structural steel contract.

General Motors of Canada, Ltd., William Street, Oshawa, Ont., will build plant addition to cost about $250,000. Allward & Gouinlock, 57 Bloor Street West, Toronto, Ont., are architects. Dominion Bridge Co., Ltd., 1139 Shaw Street, Toronto, has structural steel contract.

Canadian Marconi Co., 2440 Trenton Road, Mount Royal, Que., electrical equipment, etc., has plans for an addition to cost, with equipment, about $125,000. J. C. Meadowcroft, 1154 Beaver Hall Square, Montreal, is architect.

Ogilvie Flour Mills Co., Ltd., Sun Life Building, Metcalfe Street, Montreal, will build an addition to plant, to cost about $500,000 with equipment. Robert A. Rankin, 1114 Union Avenue, is engineer.

S. & S. Aircraft, Ltd., 215 Watt Street, Winnipeg, Man., has awarded general contract to H. E. Gibson & Co., 631 Strathcona Street, for a plant addition to cost $90,000.

THE IRON AGE

October 23, 1941

Priorities Section

What Priorities Mean—Which Forms to Use

HOW TO USE THIS GUIDE—The following information is given in this guide; (1) an index, alphabetically arranged, listing all material and equipment affecting the metal working industry under government priority or price control; (2) a list of priority orders, a description of each order, and a listing of related forms; (3) a description of methods to be used in extending priority ratings to suppliers; (4) a list of forms used in effectuating the priority orders (5) a tabulation of materials and equipment under OPA price ceilings; (6) a list of names and addresses of the OPM priorities specialists staff in Washington, and (7) a list of all field offices of OPM Priorities Division.

DEFINITION OF TYPES OF ORDERS—M-Orders—These are designated by the letter "M" in front of the serial number, as M-2, M-3, etc., and are intended to regulate the distribution of a specified MATERIAL into defense and essential civilian channels. M orders can, for example (1) place all shipments of a material under control of the Director of Priorities, (2) direct producers to favor defense orders, set up an emergency pool and allow balance of output to go free as producers determine, or (3) control usage through control of rate of production.

P-Orders—These are designated by the letter "P" and are designed to give buyers, users or manufacturers of defense or essential civilian items preference treatment over ordinary civilian work in procurement of material and supplies for the manufacture of specified products.

E-Orders—These are identified by the letter "E" and are designed to regulate the distribution of EQUIPMENT, as contrasted with M orders which control the distribution of materials.

L-Orders—These are identified by the letter "L" and set limits on the production of the particular materials or items covered.

S-Orders—Suspend operations completely for a specified period. Only one issued to date.

Index to Material and Equipment

(Symbols P, M, L and E refer to priority orders; PS indicates a price schedule)

Aircraft—P-3, P-4, P-6-a, P-13, P-9-a, P-9-b, P-9-c, P-9-d, P-9-e, P-9-f, P-47, P-52
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Charitable Institutions—see **Repairs**
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Cutting Tools—E-2, P-18, P-18-a—see also **Machine Tools**
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Explosive Plants—see **Repairs**
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Food Processing and Storage—see **Repairs**
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Freight Carriers—see **Repairs**

HOW TO MAKE REVISIONS

The revisions in this IRON AGE Priorities Guide will be given to you each week in THE IRON AGE. They will be found on the Priorities and Prices page, which appears in every issue. This guide replaces the Priorities chart appearing in this publication, issue of Sept. 25, 1941.

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Description of Priority Orders

(See "FORMS TO USE WITH PRIORITY ORDERS," page 6, for description of forms listed under column Related Form below. See section "HOW TO EXTEND PRIORITY ORDERS TO SUPPLIERS," page 5, for explanation of key letters under column How Extended below. Numbers in brackets refer to date of issuance)

"P" Orders

Order Number	Material Covered	Related Form	How Extended
P-1	Material for production of electric traveling cranes (3-12) ..... *Revoked by P-5.*		
P-2	Material for production of machine tools (3-28). *Revoked by P-11.*	PD-6	
P-3	Material entering into production of airframes (4-29) ..... Extension No. 1—Extends P-3 to Oct. 31, 1941 (9-18).	PD-13	G
P-4	Material entering into production of airplane engines and propellers (4-29) ..... Extension No. 10—Extends P-4 to Oct. 31, 1941.	PD-14	G
P-5	Material entering into production of cranes (5-26) ..... Amendment (6-14). *Revokes P-1.*	PD-6	

Order Number	Material Covered	Related Form	How Extended
P-5-a	Material for production of cranes and hoisting equipment (8-1) ... *Revokes P-5.*		
P-6	Defense supplies rating plan (5-31) ...	PD-25, PD-25-a, PD-25-b, PD-25-c	F
P-6-a	Civil aircraft, repair parts and accessories (7-21) ...	PD-25-b, PD-25-a	
P-7	Material and equipment entering into production of merchant ship construction (6-12) ...	PD-30, PD-30-a	D
P-8	Material for freight car construction (6-18) ...	PD-38, PD-38-a	D
P-9-a	Materials entering into the production of airframes for heavy bombers (6-26) ...	PD-43, PD-43-a	G
P-9-b	Aircraft engines for heavy bombers (6-26) ...	PD-44, PD-44-a	G
P-9-c	Aircraft propellers for heavy bombers (6-26) ...	PD-45, PD-45-a	G
P-9-d	Gun turrets for heavy bombers (6-30) ...	PD-46, PD-46-a	G
P-9-e	Gun sights, bomb sights, gunfire controls for heavy bombers (6-30) ...	PD-47, PD-47-a	G
P-9-f	Turbo superchargers for heavy bombers (6-30) ...	PD-48, PD-48-a	G
P-10	Material and equipment entering into conversion of ships (6-19) ...	PD-41, PD-41-a	
P-11	Material for production of metal working equipment (7-1) ... *Revokes P-2.*	PD-42, PD-42-a	H
P-11-a	Material for production of metal working equipment (9-30) ... *Revokes P-11.*		F
P-12	Aluminum scrap (6-26)	PD-40	E*
P-13	Material for production of airframes (7-3) ...	PD-52, PD-52-a	G
P-14-a	Material and equipment for construction of shipways in 1941 (7-12) ...	PD-56, PD-56-a	D
P-14-b	Material and equipment for construction of shipways in 1942 and 1943	PD-56, PD-56-a	D
P-15	Material for electrical relays and solenoid assemblies (7-11) ...	PD-57, PD-57-a	G
P-16	Material for commercial radio equipment (7-11) ...	PD-58, PD-58-a	G
P-17	Material entering into production of canning machinery ...		F
P-18	Material entering into production of cutting tool equipment (7-31) ... *Revoked by P-18-a.*		
P-18-a	Material for production of cutting tools (8-28) ... *Revokes P-18.*		F
P-19	Material for construction of defense projects (7-18) ...	PD-63, PD-63-a	F
P-19-a	Material for construction of defense projects (limited to the priorities critical list) (7-18) ...	PD-68, PD-68-a	F
P-19-b	Material for construction of certain defense projects (7-30) ...	PD-68, PD-68-a	F
P-19-e	Material for highway projects ...		F
P-20	Material for construction of specified locomotives (7-21) ...	PD-64, PD-64-a	F
P-21	Material for repair and rebuilding locomotives ...	PD-65, PD-65-a	F
P-22	Repairs (9-9) ... Interpretation No. 1 (9-15). Interpretation No. 2 (9-24). Ammend (10-16).		K
P-23	Materials for mining machinery (7-29) ...		D
P-24	Material for experimental research work (8-5) ...	PD-74, PD-74-a	M
P-25-a	Parts, accessories and equipment for light tanks (8-11) ...		F
P-25-b	Light tanks, spare parts and accessories (8-11) ...		F
P-25-c	30 caliber and 37 mm. guns (8-11) ...		F
P-25-d	Gasoline and diesel engines (8-11) ...		F
P-25-e	Light tank parts (10-14) ...		F
P-26-a	Parts, equipment for medium tanks (8-11) ...		F
P-26-b	Medium tanks, spare parts, etc. (8-11) ...		F
P-26-c	37 mm. and 75 mm. guns (8-11) ...		F
P-26-d	Gasoline and diesel engines (8-11) ...		F
P-26-e	Medium tank parts (10-14) ...		F
P-29	Health supplies rating plan (8-25) ...		F
P-31	Materials for production of foundry equipment and repair parts (9-5) ...		F
P-32	Parts for maintenance and repair of farm machinery (8-20) ...	PD-81	F
P-33	Farm machinery and equipment (8-20) ...	PD-88	F
P-38	Material for production of radio sounds (8-26) ...		
P-39	Material for production of arc and resistance welding machines (9-12) ...		F
P-40	Material for industrial lift trucks ...		
P-41	Construction, maintenance, operation of defense projects (8-27) ...		
P-42, P-42-a	Canning machinery and equipment ...		F
P-43	Research laboratory supplies (8-28) ...	PD-88, PD-107	F
P-46	Repairs, maintenance for utilities (9-17) ...		I
P-47	Maintenance, repairs of air transport facilities (9-6) ...	PD-81, PD-96	F
P-51	Canning machinery, equipment (9-22) ...		
P-52	Aircraft accessories (9-15) ...	PD-108	F
P-53	Textile machinery repairs (9-13) ...	PD-88	F
P-54	Specified types of trucks, passenger carriers, trailers (9-12) ...		J
P-55	Defense housing projects (9-12) ...	PD-105, PD-105-a, PD-105-b	
P-56	Repairs for mines. Revokes P-22 as provisions apply to mines ...	PD-119	L
P-57	Replacement parts for passenger cars, light trucks (9-18) ...		J
P-58	Supplies for specified South American mines ...		
P-61	Scrap for certain copper ingot makers, remelters ...		

Order Number	Material Covered	Related Form No.
	"M" Orders	
M-1	Aluminum (3-22)	PD-8, PD-26
M-1-a	Supplement—schedule of ratings (3-22). Supplement—modifies M-1 and M-1-a with respect to low-grade deliveries (4-11). Extension—extends M-1, M-1-a, M-1-b to Dec. 31, 1941 (5-20).	PD-39, PD-40
M-1-c	Supplement — directs distribution of scrap and secondary aluminum (6-10).	
M-2	Magnesium (3-24).	
M-2-a	Supplement (3-24), Extension—extends M-2 to Sept. 30, 1941 (4-2).	
M-3	Tungsten (3-26)	PD-9
M-3-a	Supplement (3-26). *NOTE: M-3 and M-3-a revoked by M-29.*	
M-4	Neoprene (3-28)	PD-7, PD-36
	NOTE: M-4 expired June 30; included under provisions of M-13 issued June 9, 1941.	
M-5	Nickel-bearing steel (4-10)	PD-10, PD-11, PD-17, PD-18
M-5-a	Supplement (4-10). Amendments (4-30).	
M-5-b	Supplementary order (6-17) *NOTE: M-5, M-5a, M-5-b, revoked by M-21-a.*	
M-6	Nickel (5-15)	PD-27
M-6-a	Supplementary order.	
M-7	Borax and boric acid (6-9)	PD-31
M-7-a	Supplement—extends M-7 to July 30, 1941. *NOTE: M-7 expired August 30, 1941.*	
M-8	Cork (5-31).	
M-9	Copper (5-29) Amendment (6-10). Amendment (7-9).	PD-28, PD-29
M-9-a	Supersedes M-9 (8-2).	
M-10	Polyvinyl chloride (6-9)	PD-7, PD-36
M-11	Zinc (7-1) Amendment (7-1).	PD-50, PD-50-c
M-11-a	Supplement (7-1)	PD-62
M-11-b	Supplement (8-1).	
M-11-c	Supplement (9-1). Interpretation (9-15).	
M-11-d	Supplement (10-1).	
M-13	Synthetic rubber (includes Neoprene) (6-9)	PD-7
M-14	Tungsten high-speed steel (6-11).	
M-15	Rubber (6-20)	PD-49
M-15-a	Supplement (6-27). Amendment (8-4). Amendment — white sidewall tires (8-8).	
M-16	Tricresyl and triphenyl phosphates (8-30).	
M-17	Pig iron (8-1) Amendment (10-14).	PD-69, PD-70, PD-71
M-18	Chromium (9-7) Amendment (8-22).	PD-53-a, PD-53-b, PD-54, PD-55
M-19	Chlorine (7-26).	
M-20	Calcium-silicon (7-29)	PD-72
M-21	Steel (8-9) Amendment (9-9).	PD-73
M-21-a	Supplement — relating to alloy iron, alloy steel and wrought iron (9-16).	
M-21-b	Supplement — relating to steel warehouses (9-3)	PD-83-a
	NOTE: M-5, M-5-a, M-5-b, revoked by M-21-a.	
M-23	Vanadium (8-14)	PD-84
M-24	Scrap iron and steel (10-11).	
M-25	Formaldehyde, paraformaldehyde, hexamethylenetetramine and synthetic resins (8-23). Amendment (8-28).	
M-27	Phenols (8-30).	
M-28	Chlorinated hydrocarbon refrigerants (8-22).	
M-29	Tungsten (8-31)	PD-9 Rev.
M-29-a	Supplement (10-13).	
M-30	Ethyl alcohol and related compounds (8-28).	
M-31	Methyl alcohol (8-28).	
M-32	Potassium perchlorate (8-28).	
M-33	Potassium permanganate (8-28).	
M-34	Toluene (8-28).	
M-35	Phosphorus oxychloride (8-30).	
M-36	Manila fiber and manila cordage (8-29).	
M-38	Lead (10-4).	
M-41	Chlorinated solvents, including carbon tetrachloride, trichlorethylene, perchlorethylene and ethylene dichloride.	
	"E" Orders	
E-1	Machine tools (3-28). Supplement No. 1 (7-7). *Revokes E-1*	
E-2	Cutting tools (7-17). Amendment (7-25).	
E-2-a	Supplement (8-28). *Revokes E-2, as amended*	
	"L" Orders	
L-1	Restricts production of motor truck and public passenger carriers (8-30). Amended by L-1-a.	
L-1-a	Restricts production of medium motor trucks, truck trailers, passenger carriers and replacement parts (9-12). *Amends L-1*	
L-2	Restricts production of passenger automobiles (9-13).	
L-3	Restricts production of light motor trucks (9-13).	
L-4	Restricts production of replacement parts used in repair of passenger automobiles and light trucks (9-19).	
L-5	Restricts domestic mechanical refrigerator production (9-30).	
	"S" Orders	
S-1	Suspends certain operations of Central Pattern & Foundry Equipment Co., Chicago (10-16).	

Miscellaneous Orders

Priorities Regulation No. 1 (8-27).
Priorities Regulation No. 2 (9-9).
General Metals Order No. 1. [*Terminated September 23, 1941. Restrictions imposed covered by Regulation No. 1*].

How to Extend Priority Orders to Suppliers

(Letters under column HOW EXTENDED in list of P Orders refers to methods below)

Method A

Applies to PD-1 and PD-2

In effect, OPM at present has eliminated the PD-2 and is returning to the applicant the original PD-1 application form stamped with Mr. Nelson's facsimile signature. When thus returned, PD-1 to all intents and purposes becomes the same as PD-2 which used to be issued. Applicant then sends the approved and stamped PD-1 to his supplier. If the sub-contractor or supplier wishes to extend this certificate to his sub-contractor or supplier, the same procedure applies as existed when the PD-2 was used; that is, he reapplies on another PD-1 application form.

Method B

Applies to PD-3 and PD-4

Blank copies of these certificates should be obtained from the branch of the service or government originating the certificate, which should then be filled in and certified on the back in the space provided in the left hand side. This signed set should then be taken or sent to the nearest branch of the service or government originating the certificate for certification by the procurement officer, inspector or authenticating officer. When taking or sending such certificate for authentication, the original certificate received should be taken or sent also in order that the procurement officer may identify to his satisfaction the extension which he is being asked to authenticate.

Method C

Applies to PD-5

PD-5 is extended in the same way as PD-3 and PD-4, except that there is required on the back an additional counter-signature of the government official representing the various governments from which the original PD-5 was issued.

Method D

On one of the blank copies, execute the acknowledgment ("the undersigned acknowledges receipt of . . .") and send this to the Priorities Division, OPM, Washington. Do not execute the certification. On another blank copy, execute the certification (leaving the acknowledgment blank) and forward this together with your order to the sub-contractor or supplier. Such executed copy is the extension.

Method E

Execute and have notarized the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. On another copy execute the acknowledgment and forward with the order to sub-contractor or supplier.

*P-12 can be extended only to the person from whom the smelter purchases the scrap. Follow instructions for Method E except that it is applicable only to the supplier. The acceptance must be notarized.

Method F

Execute the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. On another copy execute the acknowledgment and forward with the order to sub-contractor or supplier. (Same as Method E except that no notarization is needed.)

Method G

Execute the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. Execute the certification on another copy and have the certification also authenticated by the officer or inspector located at the plant of the issuing "producer."

Method H

Execute the acceptance and send to the Priorities Division, OPM, Washington. Execute the affidavit, filling in lines 15 and 16 with the name of the customer who sent the order to you.

Method I

Insert in the space provided, classification of the "producer." Execute in the spaces provided and send one copy to the Power Branch, OPM, Washington. Do the same with another copy except that this copy should be retained for file. In order to extend this rating from "producer" to supplier or from supplier to sub-supplier, such "producer" or supplier must endorse the following statement on the original and all copies of each purchase order or contract for materials, the delivery of which is entitled to the preference rating: "Purchase Order for Utilities Operation, Maintenance and Repair, Preference Rating A-10, pursuant to Preference Rating Order No. P-46" (Authorized Signature) and deliver the original or copy to the seller of such material.

Method J

Order for material is endorsed by producer and supplier as follows: "An (A-3; A-10) preference rating is assigned to this purchase order pursuant to Limited Preference Rating Order No. (P-54; P-57). This application of rating is made by the (supplier; producer) upon the conditions set forth on said order, with which we are familiar.

—(Authorized signature of producer or supplier)."

Note: P-54 assigns A-3 rating; P-57 assigns A-10 rating.

Method K

A producer or supplier in order to apply the preference rating to deliveries of material to him, must endorse the following statement on the original and all copies of the purchase order or contract for such material manually signed by a responsible official duly designated for such purpose by the producer or supplier: "Material for maintenance, repair or operating supplies—Rating A-10 under Preference Rating Order P-22, as amended, with the terms of which I am familiar. (Authorized signature)."

Method L

In order to apply the A-1 rating, send a statement to the OPM at Washington describing the material and the nature of the emergency. OPM will certify the application, which is to be passed on to the supplier.

To extend the A-8 priority endorse as follows: "Purchase order for material for a mine rating pursuant to Preference Rating Order P-56 Mine Serial No. ....., Rating A-8. This application is made pursuant to the terms and conditions of that order with which the undersigned is familiar.

—Authorized Signature."

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IMPORTANT: Each Preference Rating Order contains full instructions for applying the rating to delivery of material, and the order should be consulted whenever questions arise.

Forms to Use With Priority Orders

Form No.	Description
PD-1	Application for preference rating.
PD-1-a	Discontinued.
PD-1-c	Preference rating application to be used by ship repair yards for inventory supplies.
PD-2	Domestic civilian preference rating certificate.
PD-3	Army or Navy preference rating certificate.
PD-4	U. S. Government agency preference rating certificate, other than Army and Navy.
PD-5	Foreign government preference rating certificate.
*PD-6	Tabulation of extension for preference ratings made pursuant to general preference order P-2 and P-5.
*PD-6-a	Alternate of Form PD-6. Not to be used if PD-6 has been used.
PD-7	Monthly synthetic rubber requirements.
PD-8	Priority rating index of products requiring aluminum.
PD-9	Request for ferrotungsten, tungsten powder or tungsten compounds.
PD-10	Requests for nickel bearing steel.
PD-11	Report of inventory of nickel bearing steel.
PD-12	Copper and copper alloy production. (Not issued.)
*PD-13	Tabulation of preference rated orders placed during a given month, pursuant to Order P-3.
*PD-14	Tabulation of preference rated orders placed during a given month, pursuant to Order P-3.
PD-17	Receipts of nickel bearing steel in January, February, and March, 1941, and inventory as of April 30, 1941. (Report of distributer.)
PD-18	Receipts and shipments of nickel bearing steel for a given month. (Report of distributer.)
PD-19-a	Customer's sworn statement. (To be filed with suppliers concerning General Metals Order No. 1.)
PD-19-b	Supplier's statement of compliance with General Metals Order No. 1.
PD-20	Application for priority allocation.
PD-23	Report to be filed by all customers requesting delivery of aluminum after a given date.
PD-24	Priorities critical list.
PD-25	Report of requirements for scarce materials for a given quarter in connection with Order P-6.
PD-25-a	Report of requirements for scarce materials for a given quarter. (Not issued.)
*PD-25-b	Report of extension of Defense Supply Rating Order.
*PD-25-c Revised *PD-25-d	Customer's certificate of defense requirements in conjunction with Defense Supplies Rating Order.
PD-26	Aluminum monthly shipping schedule.
PD-27	Detailed application for nickel required for melting in a given month, and statement of stocks and consumption.
PD-29	Report of cork shipments and processing requirements pursuant to Order M-8.
*PD-30	Tabulation of preference rated orders placed for a given month, pursuant to Order P-7.
*PD-30-a	Alternate form to PD-30.

Form No.	Description
PD-31	Report of stocks and use of borax and boric acid, pursuant to Order M-7.
PD-32	Customer's statement of failure to obtain required delivery of steel. (Obsolete)
PD-32-a	Priority Division order on producer of items under PD-32 for which delivery has been refused. (Obsolete)
PD-33	Report of producer's stock, and production and orders, covering Order to direct the distribution of synthetic rubber.
PD-34	Producer's affidavit concerning failure to meet customer's requirements for delivery of steel.
PD-35	Producer's affidavit concerning refusal to accept customer's order.
PD-36	Consumption, allotment and receipts of synthetic rubber materials and plasticized resins, pursuant to Orders M-10 and M-13.
PD-37	Reports of production of duty-free refined copper.
*PD-38	Tabulation of preference rated orders placed during a given month, pursuant to Order P-8.
*PD-38-a	Alternate form to PD-38.
PD-39	Statement substantiating evidence of monthly aluminum delivery schedule.
PD-40	Inventory and consumption of aluminum. To be filed by companies requesting aluminum for delivery after July 5.
*PD-42	Tabulation of extensions of preference ratings made pursuant to Order P-11.
*PD-42-a	Alternate to Form PD-42.
*PD-43	Tabulation of extensions of preference rated orders placed pursuant to Order P-9-a.
*PD-43-a	Alternate form to PD-43.
*PD-44	Tabulation of extensions of preference rated orders placed pursuant to Order P-9-b.
*PD-44-a	Alternate to Form PD-44.
*PD-45	Report of preference rated orders placed pursuant to Order P-9-c.
*PD-45-a	Alternate to Form PD-45.
*PD-46	Report of preference rated orders placed pursuant to Order P-9-d.
*PD-46-a	Alternate to Form PD-46.
*PD-47	Report of preference rated orders placed pursuant to Order P-9-e.
*PD-47-a	Alternate to Form PD-47.
*PD-48	Report of preference rated orders placed pursuant to Order P-9-f.
*PD-48-a	Alternate to Form PD-48.
PD-49	Report of crude rubber stocks and consumption, pursuant to Orders M-15 and M-15-a.
PD-50	Customer's affidavit concerning zinc.
PD-50-a	Producer's affidavit of compliance with preference order on zinc.
*PD-52	Report of preference rated orders placed pursuant to Order P-13.
*PD-52-a	Alternate to Form PD-52.
PD-53-a	Report on chromium requirements.
PD-53-b	Report on chromium stocks, shipments and consumption.
PD-54	Request for chromium chemicals.
PD-55	Request for chromite refractories.
*PD-56	Report of preference rated orders placed pursuant to Order P-14-a.

Form No.	Description
*PD-56-a	Alternate to Form PD-56.
*PD-57	Report of preference rated orders placed pursuant to Order P-15.
*PD-57-a	Alternate to Form PD-57.
*PD-58	Report of preference rated orders placed pursuant to Order P-16.
*PD-58-a	Alternate to Form PD-58.
PD-59	Application for copper for domestic use.
PD-60, PD-60-a, PD-60-b, etc.	Obsolete.
*PD-62	Application for allocation of zinc oxide.
*PD-63	Report of contracts or orders to which rating assigned by Order P-19 has been applied during a month.
*PD-63-a	Certification to accompany purchase orders furnished by the builder or supplier in connection with P-19.
*PD-64	Reports of contracts or orders to which rating assigned by Order P-20 has been applied during a month.
PD-64-a	Certification to accompany purchase orders furnished by the builder in connection with P-20.
*PD-65	Report of contracts or orders to which rating assigned by Order P-21 has been applied during a month.
PD-65-a	Certification to accompany purchase order furnished by the repairer or builder in connection with P-21.
*PD-68	Report of contracts or orders to which rating assigned by Order P-19-a has been applied during a month.
PD-68-a	Certification to accompany purchase orders furnished by the builder or supplier in connection with P-19-a.
*PD-69	Customer's pig iron order for shipment.
PD-70	Customer's report of inventory and consumption of pig iron.
PD-71	Pig iron producer's shipping schedule.
PD-72	Requirements of calcium silicon.
*PD-73	Customer's statement to producer classifying purchase order or contract for steel.
PD-76	Copper allocation certificate.
PD-79	Requirements of scarce materials in connection with Order P-29.
*PD-81	Monthly report of rating assignments in connection with various specified priority orders.
PD-81-a	Alternate to Form PD-81.
PD-83-a	Steel warehouse statement of deliveries for first quarter of 1941.
PD-83-c	Producers statement regarding consigned steel sales and stocks.
PD-83-d	Classification instructions for steel warehouse report PD-83-a.
PD-84	Monthly report of vanadium inventories and consumption.
PD-88	Application for preference rating order.
PD-90	Obsolete.
*PD-93	Report of preference rated orders placed pursuant to Order P-43.
PD-96	Application for preference rating for scarce materials needed for maintenance and repair of aircraft, in connection with Order P-47.
PD-97	Report of aluminum foil inventory and use in manufacture of fixed condensers.
PD-101	Quarterly report of high-speed steel orders and shipments, pursuant to Order M-14.
PD-105, PD-105-a, PD-105-b	Application for preference rating in connection with privately financed defense housing projects, and documentation sheets pursuant to order P-55.
PD-107	Questionnaire for applicants for supplies and equipment in connection with Order P-43.
PD-108	Application for preference rating in connection with Order P-52.
PD-109	Report of foundry receipts, purchase and consumption of copper and copper alloy scrap between Sept. 30 and Nov. 1, pursuant to Order M-9-b.
PD-114	Application for authorization to enter into toll processing agreement for aluminum and magnesium.
*PD-119	Monthly report of purchases, of supplies, maintenance items and repairs under Order P-56.

*These forms may be reproduced, but no changes of any nature from the original text are permitted.

OPA Price Ceilings Affecting the Metal Working Industry

(Numbers in brackets refer to date of issuance)

Price Schedule	Subject
No. 1	Second-hand machine tools (2-17) Amendment (2-15)–(4-9)–(9-24) Supplement 1 (5-7)
No. 2	Aluminum scrap (3-24) Explanation (5-2) Amendment (5-7)–(6-2)–(8-14)
No. 3	Zinc scrap (3-31) Statement of policy (4-9) Amendment (10-18)
No. 4	Iron and steel scrap (4-3) Amendment (4-9)–(5-7)–(6-18) – (6-21) – (8-7) – (8-26) – (9-5) – (9-22) – (9-24)
No. 5	Bituminous coal (4-2) Supplement 1 (4-16) Price Schedule 5 and Supplement 1 revoked (5-1)
No. 6	Iron and steel products (4-16) Revised (6-20)
No. 8	Nickel scrap (5-29) Amendment (6-26)–(9-5)–(9-18)
No. 10	Pig iron (6-24)
No. 12	Brass mill scrap (7-21) Amendment (10-1)
No. 13	Douglas fir logs (8-1) Amendment (9-24)
No. 15	Copper (8-8) Amendment (8-28)
No. 17	Pig tin (8-14) Amendment (9-19)
No. 18	Burlap (8-15)
No. 19	Southern pine lumber (8-16) Amendment (9-3)
No. 20	Copper scrap (8-18)
No. 21	Formaldehyde (8-20)
No. 22	Pennsylvania grade crude oil (8-22)
No. 26	Douglas fir lumber (9-11)
No. 27	Anthracite coal (9-11) Price Schedule No. 27 revoked (9-18)
No. 28	Ethyl alcohol (9-15)
No. 29	Coke (9-18)
No. 30	Waste paper sold east of the Rocky Mountains (9-18)
No. 31	Acetic acid (9-24)
No. 32	Paperboard sold east of the Rocky Mountains (9-30)
No. 34	Wood alcohol (10-3)

Where to go in Washington for Priorities Information

Members of the Priorities Specialists Staff of OPM, capable of rendering assistance on specific commodity problems, are listed below, together with their room and telephone numbers, according to the latest information available from OPM.

Priorities Specialists Staff, OPM, New Social Security Building

Telephone Republic 7500

Samuel S. Stratton, technical consultant to director—Ext. 726 Room 5714
John W. Harriman, assistant to technical consultant—Ext. 2898 Room 5714

SUBDIVISION "A"

Code	Branch	Specialist	
A-1	Aluminum and Magnesium	E. S. Ferguson	Ext. 2518 Room 3305
A-2	Pulp and Paper	J. L. Rtichie	Ext. 2372 Room 4036
A-3	Chemicals	F. H. Cabot	Ext. 476 Room 4613
A-4	Heat, Light and Power	W. J. Zepp	Ext. 2377 Room 3193-D
A-5*	Iron and Steel	Charles Halcomb	Ext. 2073 Room 5728

SUBDIVISION "B"

B-1	Aircraft	C. C. Crawford	Ext. 2357 Room 4421
B-2	Ordnance	W. G. W. Glos	Ext. 665 Room 4309
B-2*	Tanks and Combat Vehicles	Allen B. Hood	Ext. 787 and 786 Room 1052
B-3	Automotive	John E. Graham	Ext. 2753 Room 2748
		Fred E. Lavis, Jr.	Ext. 2706 Room 2748
B-4	Tools	L. K. Vry	Ext. 766 Room 3340

SUBDIVISION "C"

C-1	Shipbuilding	W. C. Wetherill	Ext. 2647 Room 4718
C-2	Construction	W. C. Wetherill	Ext. 2647 Room 4718

SUBDIVISION "D"

Code	Branch	Specialist	
Head	Priority Specialist	J. Wilton Peters	Ext. 3192 and 2856 Room 2064
D-1	Subsistence	Charles S. Smith	Ext. 2021 and 2022 Room 2627
D-2	Equipment and Supplies	Austin Cunningham	Ext. 2979 Room 2060
	1. Health Supplies Rating Plan	Austin Cunningham	Ext. 2979 Room 2060
D-3	Clothing and Equipage		
	1. Fibers	Walter P. McGowan	Ext. 3192 Room 2064
	2. Textiles	Samuel A. Palmer	Ext. 2856 Room 2064
D-4	Industrial Materials	Spaulding Birss	Ext. 3192 Room 2066

SUBDIVSION "E"

E-1	Rubber, Cork, etc.	Robert T. Williams	Ext. 3174 Room 3360
E-2*	Nickel	Stephen P. Dorsey	Ext. 2579 Room 3330
E-3	Tungsten, Cobalt Molybdenum Vanadium Antimony Beryllium	Wilbur A. Nelson	Ext. 2277 Room 3314
E-4	Copper, Zinc, Brass Cadmium, etc.	Paul T. Brady	Ext. 3121 Room 3359

SUBDIVISION "E"—Continued

Code	Branch	Specialist	
E-5	Manganese Chrome Ferro-silicon Titanium and Rutile, Zircon, Columbium, Tantalum, etc.	Wilbur A. Nelson	Ext. 2277 Room 3314
E-6	Tin, Lead, Ilmenite (Pigment)	Wilbur A. Nelson	Ext. 2277 Room 3314
E-7*	Mica, Fluorspar Cryolite, Graphite, Magnesite, Gypsum	Wilbur A. Nelson	Ext. 2277 Room 3314
E-8*	Misc. Minerals Asbestos Mercury Industrial diamonds Quartz crystals Platinum metals Radium Uranium Kyanite Abrasives Diamond dies Jewel bearings	Wilbur A. Nelson	Ext. 2277 Room 3314

OFFICE OF PETROLEUM CO-ORDINATOR

Petroleum	James E. Hughes	Interior-89 Ext. 4616, 4617 Room 7427 New Interior Buildin

* Temporary appointment

Field Offices of OPM Division of Priorities

These offices are organized to assist industry answer problems arising from the application of the priorities system. All field offices are under the supervision of L. E. Scriven, Director, Priorities Field Service, Washington. Listed below are the addresses of all offices opened to date and the names of the office managers.

ATLANTA, GA.
Federal Reserve Bank Bldg., John B. Reeves

BALTIMORE
Baltimore Trust Bldg., T. M. Chandles.

BOSTON
30 Peach St., W. P. Homans.

BUFFALO
M & T Bank Bldg., Paul R. Smith.

CHARLOTTE, N. C.
Liberty Life Bldg., J. E. MacDougell.

CHICAGO
230 South LaSalle St., W. G. Bailey.

CINCINNATI
Union Trust Bldg., Bruce W. Burroughs.

CLEVELAND
Federal Reserve Bldg., W. T. Walker.

DALLAS, TEXAS
Wood & Akard Streets, J. B. Crockett.

DENVER
U. S. National Bank Bldg., Virgil L. Board.

DETROIT
160 Fort Street, West; Walter Hall.

HELENA, MONT.
Federal Reserve Bank Bldg., Oscar A. Baarson.

HOUSTON, TEXAS
Federal Reserve Bldg., George L. Noble, Jr.

INDIANAPOLIS, IND.
Circle Tower Bldg., Albert O. Evans.

JACKSONVILLE, FLA.
Hildebrandt Bldg., G. H. Andrews.

KANSAS CITY, MO.
Federal Reserve Bank Bldg., Clifford Carr.

KNOXVILLE, TENN.
(Address not announced), Dyer Butterfield.

LOUISVILLE, KY.
Todd Bldg., 4th & Market St., James T. Howington.

LOS ANGELES
1151 South Broadway, G. Howard Hutchins.

MEMPHIS, TENN.
Sterrick Bldg., J. S. Bronson.

MINNEAPOLIS
Rand Tower Bldg., Willard F. Kiesner.

NASHVILLE, TENN.
1015 Stahlman Bldg., George S. Gillen.

NEW ORLEANS
(Address not announced), John A. Bechtold.

NEW YORK
25 Broad Street; John B. Pollock.

OKLAHOMA CITY, OKLA.
Federal Reserve Bank Bldg., C. F. Aurand.

PHILADELPHIA
925 Chestnut Street; F. W. Slack.

PITTSBURGH
Grant Street & Ogle Way; C. F. Cruciger.

PORTLAND, ORE.
Bedell Bldg., J. Fred Bergesch.

RICHMOND, VA.
Federal Reserve Bank Bldg., Fred P. Wilmer.

SALT LAKE CITY
Utah Oil Bldg., Ralph E. Bristol.

SAN ANTONIO, TEXAS
415 W. French Place, Carl L. Pool.

SAN FRANCISCO
Federal Reserve Bank Bldg., Andrew L. Kerr.

SEATTLE
960 Stuart Bldg., W. D. Shannon.

ST. LOUIS
411 Locust Street, Louis E. Crandall.